

CSPro

Getting Started

Version 2.5

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CSPro Getting Started Guide

Introduction

What is CSPro?

The **C**ensus and **S**urvey **P**rocessing System (**CSPro**) is a software package for entry, editing, cross-tabulation, and dissemination of census and survey data. CSPro combines the features of the Integrated **M**icrocomputer **P**rocessing System (**IMPS**) and the Integrated **S**ystem for **S**urvey **A**nalysis (**ISSA**) in a Windows environment.

CSPro lets you create, modify, and run data entry, batch editing, and cross-tabulation applications from a single, integrated development environment. It processes data on a case basis (one or more questionnaires), where a case can consist of one or many data records. The data are stored in (ASCII) text files described by data dictionaries. CSPro contains a powerful common procedure language to implement data entry control and edit rules.

CSPro also provides tools to view data and other text files, to view tables and thematic maps created by CSPro, to convert IMPS and ISSA data dictionaries to and from CSPro, and to convert ERSI shape files (maps) to CSPro map files.

CSPro was developed jointly by the U.S. Census Bureau, Macro International, and Serpro, SA, with major funding from the U.S. Agency for International Development.

CSPro is in the public domain. It is available at no cost and may be freely distributed. It is available for download at <http://www.census.gov/ipc/www/cspro>.

This guide contains information about installing and uninstalling CSPro, followed by a tutorial that will guide you through a series of exercises to help you get started using CSPro.

CSPro Features

Function	Capabilities
Data Entry	Add, modify, verify and view cases (questionnaires). Create an unlimited number of forms (screens). Create forms bigger than the computer screen that scroll as necessary. Create forms with fields from different physical records. Enter data from rosters. Create consistency checks and skip patterns of unlimited complexity. Execute procedures before and/or after field is entered. Display user-defined messages. Access multiple look-up files. Read from and write to secondary files. Index cases to avoid duplication. Produce operator statistics. Create a stand-alone data entry environment.
Batch Editing	Identify and report structure, value, and consistency errors in questionnaire data. Change (impute) data values based on simple or complex methods. Produce summary or detailed reports of errors and

	corrections. Access multiple look-up files. Read from and write to secondary files.
Cross-tabulation	Cross-tabulate up to four variables. Select the universe of tabulation. Tabulate values and weights. Tabulate counts and/or percents. Create frequency distributions. Save tabulations in several formats. Copy tables to spreadsheets or word-processing documents. Produce tables by geographic area. Map results by geographic area.
Data Dictionary	Define simple or complex hierarchical file organization. Define hierarchical levels, identification items, records, items (fields or variables), value sets (categories of values), and values. Create descriptive notes for documentation. Define multiply-occurring items. Produce reports of file organization.
Text Viewer	View, but not change, any data or other text file. The file can be of any length and may contain lines up to 32,000 characters wide. Find text in the file. Identify the line and character position in the file. Copy tabular reports to spreadsheet programs. Copy, save, or print selected parts of the file.
Table Viewer	View, but not change, a file containing the results of CSPro tabulations. Copy all or parts of tables to word processing programs. Print all or parts of tables. Save all or parts of tables in HTML (for Internet), RTF (for word processors), or TAB delimited (for spreadsheet) formats. Create and view thematic maps of selected cells.
Map Viewer	Generate a thematic map of a selected variable at a selected geographic level. Combine two variables as a difference, percent change, ratio or percent ratio. Vary the number of intervals, size of the intervals, colors, titles and legends. Change lowest geographic level shown. Copy the maps to a word processor. Save a map in GIF (for Internet) format.
Table Retrieval	Retrieve and display tables and other previously prepared documents from a large database of documents based on geography, subject matter, and title. At the present time, a CSPro tool does not exist to develop the database that TRS uses.
Frequencies	Produce frequency distributions of selected variables and records in data files.
Sort Data	Sort data cases based on case identification. Data file may be as large as 2 GB.
Export Data	Export selected data variables to tab-delimited or SAS, SPSS, or SAS formatted data files.
Reformat Data	Reformat data from one file format to another. The formats of both the input and output files are defined by data dictionaries.
Compare Data	Compare two data files and identify the differences. A common data dictionary defines the format of both data files.
Concatenate Data	Concatenate (join end-to-end) two or more data (or other text) files.

- Convert Dictionaries Convert IMPS and ISSA data dictionaries to CSPro data dictionaries, or convert CSPro dictionaries to IMPS or ISSA dictionaries. Convert ISSA dictionaries to CSPro data dictionary and data entry forms.
- Convert Shape to Map Convert ERSI shape files to CSPro map files. Thin the number of coordinates in the map.

Installation

Hardware and Software Requirements

A minimum configuration:

- 33MHz 486 processor
- 16MB of RAM
- VGA monitor
- Mouse
- 45MB of free hard drive
- Microsoft Windows 95

A recommended configuration:

- Pentium processor
- 256MB of RAM
- SVGA monitor
- Mouse
- 45MB of free hard drive space
- Microsoft Windows 98, Me, NT 4.0, 2000, or XP

Installing CSPro

If you are installing from our CD:

- Place the CD in your CD-ROM drive
- Wait for a few seconds—the installation program will automatically launch.
- Proceed through the setup process. This will take you through a series of dialog boxes, which will prompt you for setup information.

If you are installing from floppy diskettes:

- From the **Start** button on the taskbar, select **Run**.
- Place CSPro Disk 1 in your diskette drive.

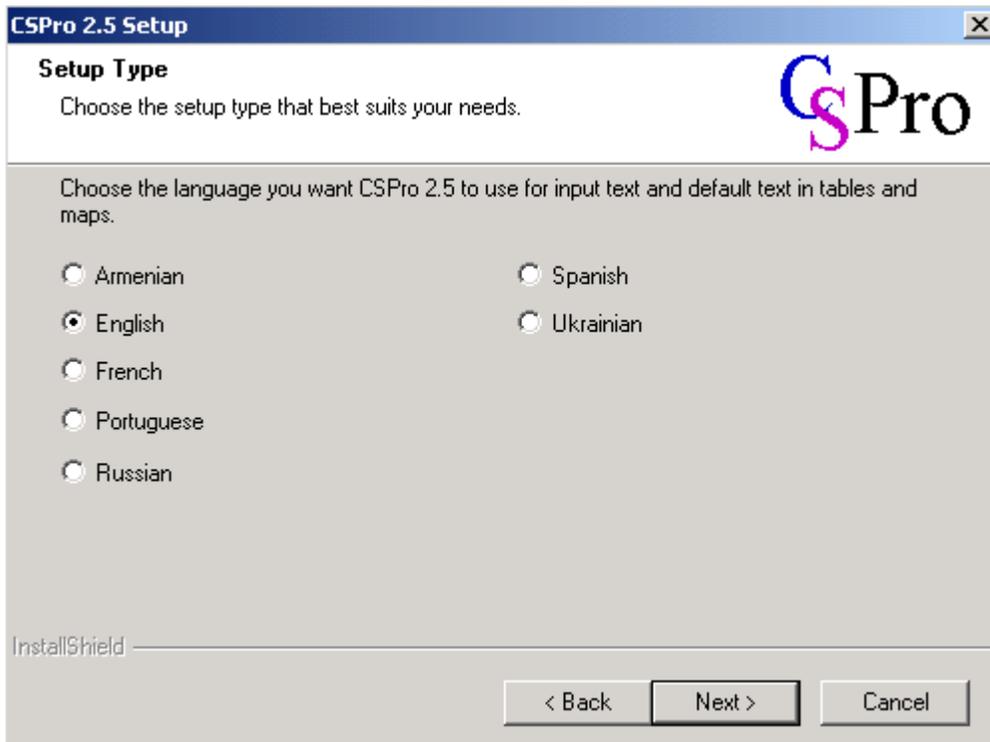
- Enter **a:\setup**.
- Click **OK**. The setup process takes you through a series of dialog boxes that prompt you for setup information.

If you are installing from a file which you downloaded from our web site:

- From the **Start** button on the taskbar, select **Run**.
- Enter **drive:\folder\cspro24.exe** (For example: c:\download\cspro24.exe)
- Click **OK**. The setup process takes you through a series of dialog boxes that prompt you for setup information.

Selecting languages for installation:

CSPro allows you to select a language that will be used in some parts of the system. During installation you will be presented with the following language screen:



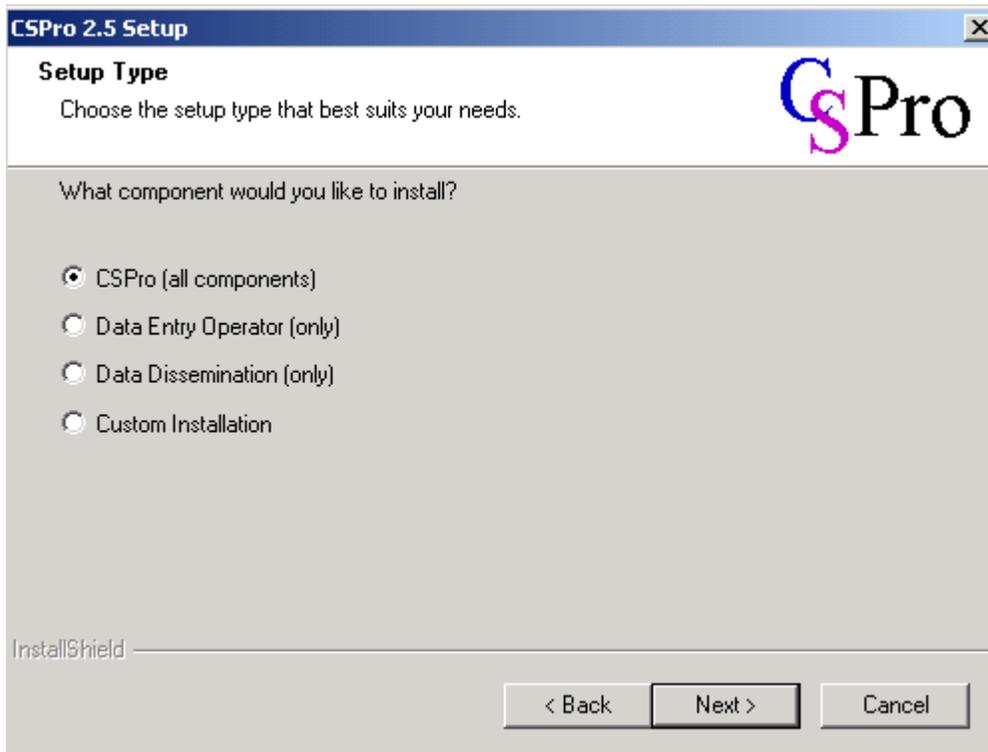
The language setting determines:

- the small words (Table, and, by, Legend, etc.) generated by tables and maps
- the font style, in order to support languages such as Russian, Ukrainian, or Armenian on data entry screens and in tabulation output.

Note that CSPro's menu options, dialog boxes, and the help system are only available in English. You can always change the language setting by rerunning the installation program and choosing "Modify."

Selecting components for installation:

CSPro allows you to select which components of the system you want to install. During the installation you will see the following component screen:



You have the following choices:

- CSPro (all components). Select this if you plan to develop applications.
- Data Entry Operator (only). Select this if you are installing a data entry application on a production machine. The operator will be able to run an already-created data entry application, but will not be able to make any changes to it. The Data Entry, Compare Data, Text Viewer, and Table Viewer components are installed.
- Data Dissemination (only). Select this if you are installing CSPro data dissemination tools for the user to access statistical data you have produced using CSPro. The Map Viewer, Table Retrieval, Table Viewer, Text Viewer, and Compare Data components are installed.
- Custom Installation. Advanced users can select any particular set of components, such as a particular tool.

At any later time, you can change the components installed by rerunning the installation.

Uninstalling CSPro

The following is based on a Windows 2000 setup. Your steps may vary if using a different operating system.

- From the **Start** button on the taskbar, select **Settings – Control Panel**.
- Select **Add/Remove Programs**.
- From the list of currently installed programs, click on **CSPro 2.5**.
- Click the **Change/Remove** button.
- The installation program prompts you to select the type of installation. Select **Remove** and press the **Next** button.
- At the prompt, click **OK** to confirm that you want remove CSPro 2.5. The uninstall program will remove all registry entries and CSPro system files (that is, all files within the CSPro 2.5 folder its Examples subfolder). It will not remove any applications or other files you have created.
- When the files are removed, the installation program indicates that the process is complete. Click **Finish**.

Installing a Newer Version

Updating to CSPro 2.5 from CSPro 2.4

If you have CSPro 2.4 installed on your computer, you can install CSPro 2.5 without affecting the CSPro 2.4 installation. When you have finished your conversion of applications to CSPro 2.5, you can then uninstall CSPro 2.4.

Please note that due to internal changes within CSPro 2.5, once files have been loaded in CSPro 2.5, you may no longer be able to load them in CSPro 2.4.

Updating a previous version of CSPro 2.5

If you are updating a previous version of CSPro 2.5, the new version will replace the older version. When the installation program prompts you to select the type of installation, select **Repair** and press the **Next** button. The installation program will copy the updated version of CSPro 2.5 over top the older version. It will not change any applications or other files you have created.

Changing Language or Components

You can change the language or components that are installed on your computer by running the installation again. When the installation program prompts you to select the type of installation, select **Modify** and press the **Next** button.

Make any changes you wish to make and press the **Next** button. Your installation will be changed. New components will be added and unwanted components will be removed. Application and data files will NOT be affected.

CSPro Tutorial

About the Tutorial

The tutorial will guide you through a series of exercises to help you get started using CSPro.

The exercises in the tutorial require no special knowledge other than a basic familiarity with Windows. The exercises are divided into very short steps. Each step normally takes only a few minutes.

There are seven exercises. You create files in each exercise that are used in later exercises. Exercises 1 through 5 show you simple data entry and cross tabulation. Exercises 6 and 7 show you the CSPro language for editing.

Exercise 1: Create a Data Entry Application (3 steps)

Exercise 2: Create the Data Dictionary (4 steps)

Exercise 3: Create the Data Entry Forms (3 steps)

Exercise 4: Enter Data (4 steps)

Exercise 5: Tabulate Data (3 steps)

Exercise 6: Add Edits to the Data Entry Application (4 steps)

Exercise 7: Run a Batch Application (4 steps)

Exercise 1: Create a Data Entry Application

Step 1: Examine the Tutorial Questionnaire

[Exercise 1, Create a Data Entry Application]

The first seven tutorial exercises are based on a sample questionnaire.

- In Exercises 1 through 5 we will create a data entry application, key some data, then tabulate the data.
- In Exercises 6 and 7 we go back and add a consistency check.

Household ID				CSPRO TUTORIAL QUESTIONNAIRE			
ALL PERSONS							
	Age	Sex		Marital Status			
		1 - Male 2 - Female		1 - Married 2 - Not married			
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
HOUSEHOLD INFORMATION							
Type Housing				Type Roof			
1 - Single family				1 - Wood			
2 - Multi-family				2 - Metal			
3 - Homeless				3 - Other			

Note the following about the sample questionnaire:

- Each questionnaire corresponds to a household.
- Each questionnaire (household) has a unique four-digit number at the top.
- We collect age, sex, and marital status for up to ten people in the household.
- We collect type of housing and roof for the household.

Continue to the next step.

Step 2: Start CPro

[Exercise 1, Create a Data Entry Application]

First, create a new folder for all files you will use in this tutorial.

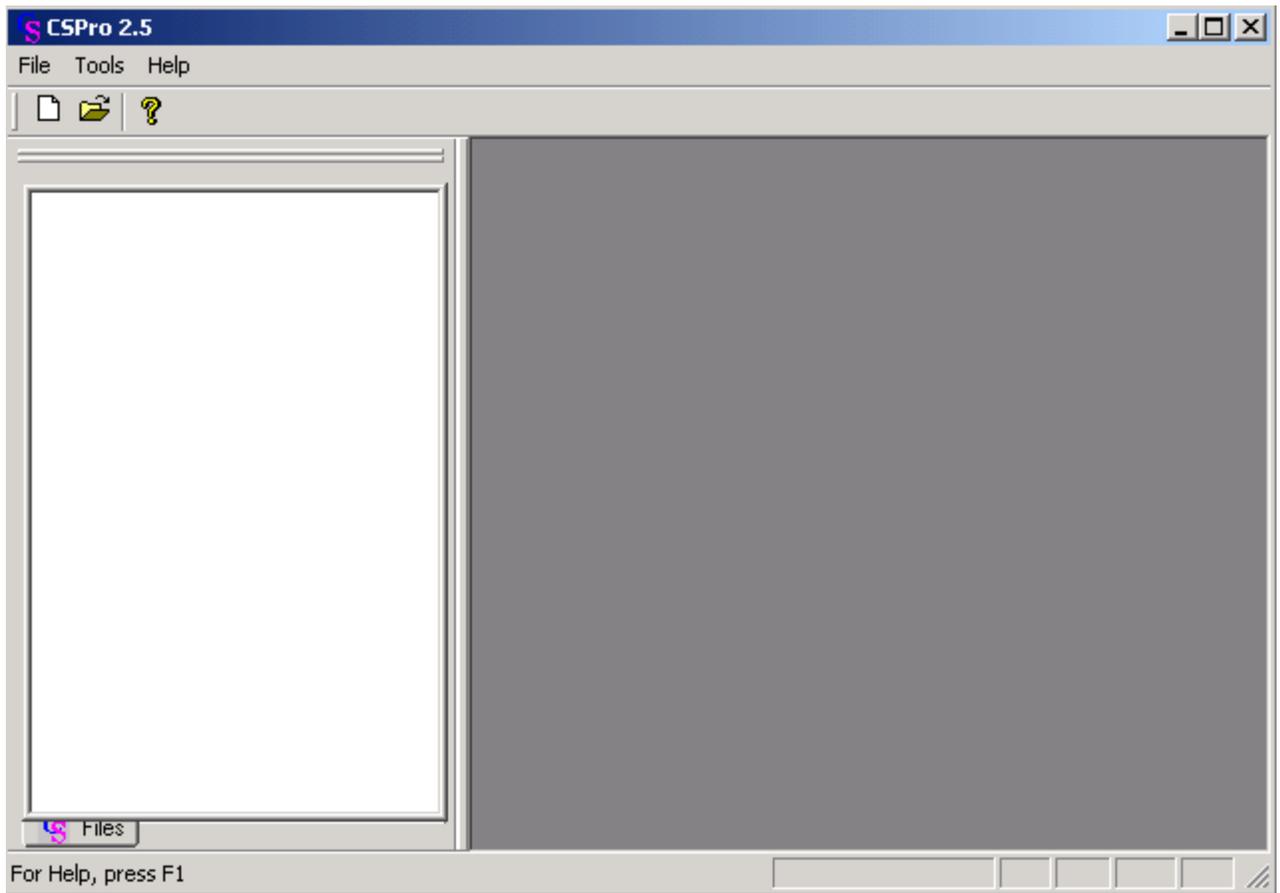
- Open **Windows Explorer**
- Create a folder named "c:\CProTutorial".

Now we are ready to start CPro:

- Click the **Start** button

- Highlight the **Programs** line
- Highlight **CSPro 2.5** next to **Programs**
- Highlight and click **CSPro 2.5** next to **CSPro 2.5**
- **OR**, you can double-click on your desktop's CSPro 2.5 icon.

The CSPro main screen will appear.



Continue to the next step.

Step 3: Use Wizard for New Application

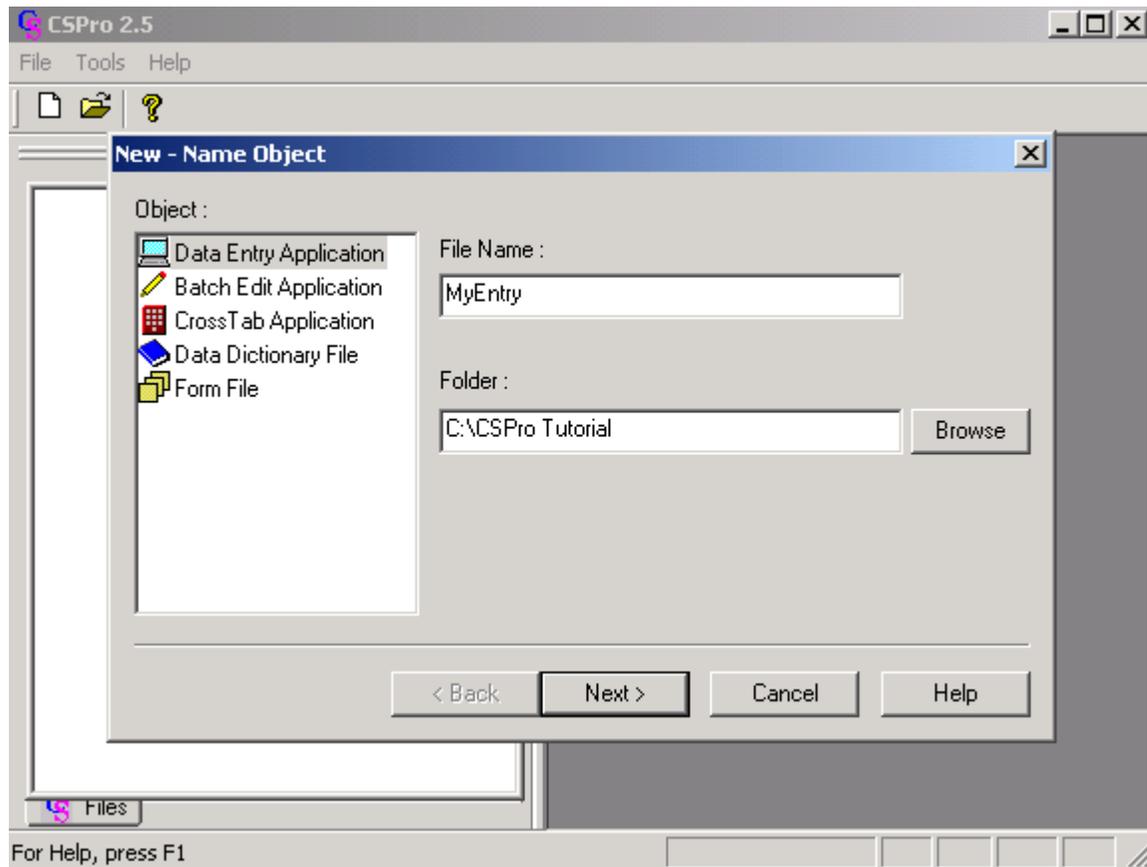
[Exercise 1, Create a Data Entry Application]

We will create a data entry application. This contains:

- **Data dictionary** The data dictionary describes the organization of the data file. It holds information about all the questions and responses on the questionnaire.
- **Forms** The forms will appear on the screen when you run the data entry application. They contain data entry fields, text, and lines.
- **Logic (optional)** You can use the CSPro language to control the flow of your program, to write logic to check for errors during data entry, to access lookup files, and many other things. We will not use logic until Exercise 6.

We will use the Wizard to create the files that the data entry application requires.

- Select **File/New** from the main menu, or click  on the toolbar.
- Click on **Data Entry Application**.
- Enter "MyEntry" as the file name for the application.
- Enter the Folder name you created in step 1.



- Click on **Next**.
- The next screen will ask you to name the primary form file. By default, "c:\CSProTutorial\MyEntry.fmf" will appear. Click **Next** to accept this default.
- The next screen will ask you select the primary dictionary. Enter "c:\CSProTutorial\MyDict.dcf", then click **Next**.
- You should see the checkered flag. Click **Finish** and you're done!

This completes this exercise. Continue to the next exercise.

Exercise 2: Create the Data Dictionary

Step 1: The ID Item

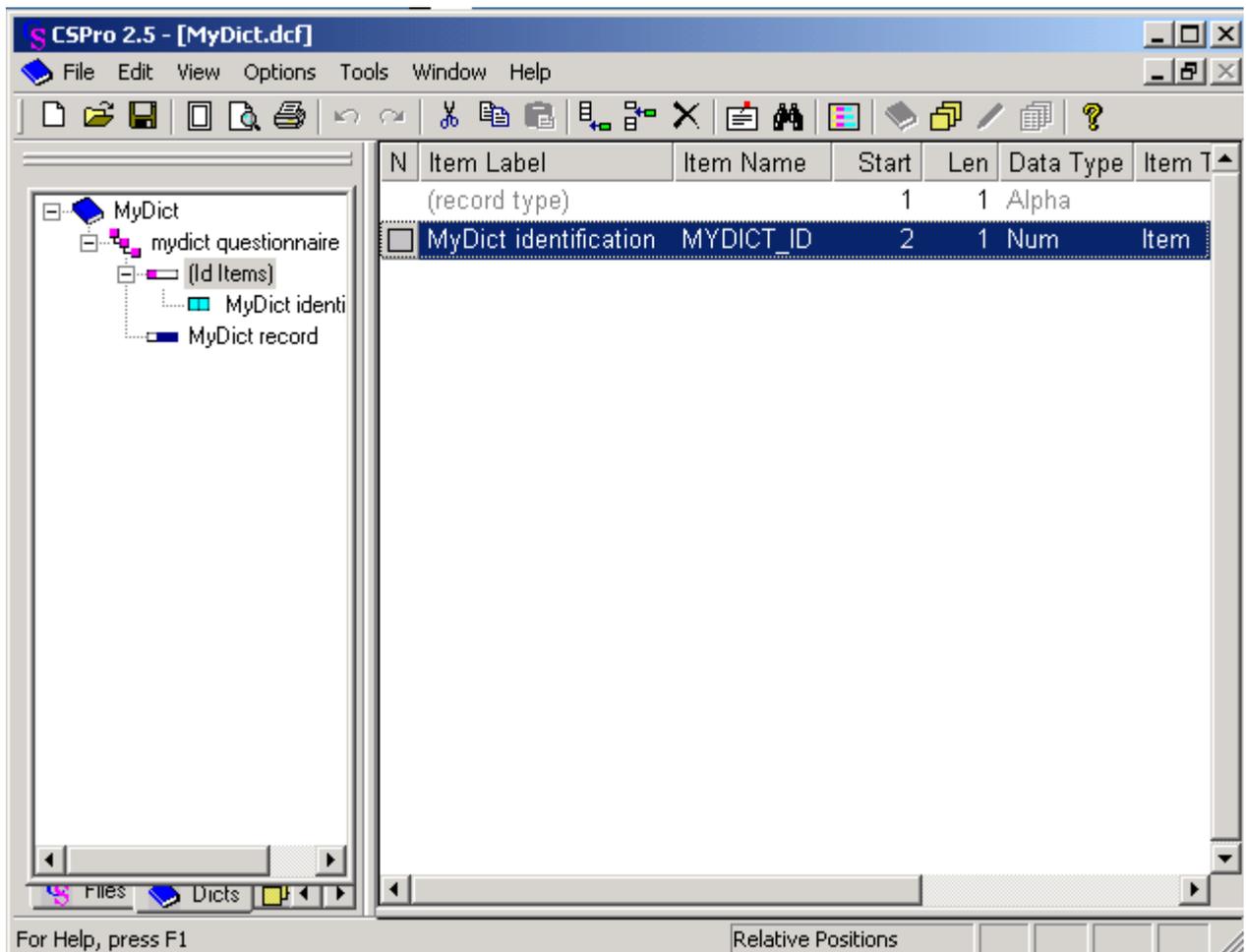
[Exercise 2, Create the Data Dictionary]

We will make our dictionary first, then our forms. CSPro automatically generates a skeleton data dictionary. We will change it and add our own information.

Every data dictionary requires at least one Id item—you will often have more than one. An ID (**identification**) item is a unique number (or series of numbers) that allows CSPro to distinguish between individual questionnaires. CSPro requires at least one ID item.

- Click on **(Id Items)**, then on the '+' next to it to open the tree on the left side of the screen. You will see that CSPro has created one id item. On the right side of the screen you will see in the **Len** column that this item has the length of one character. We will make this four characters.
- Right-click on 'MyDict identification', below **(Id Items)** on the tree, then select **Modify Item**.
- Press the Enter key three times until the length is highlighted in blue.
- Type "4", then Enter, then click on the white space below this line to finish making this change.

When you have completed this step the screen should look something like:



Continue to the next step.

Step 2: The Records

[Exercise 2, Create the Data Dictionary]

A record usually corresponds to a section of a questionnaire, and consists of a group of related questions.

By default, CSPro creates one record. Our tutorial application will have two records, a 'Person Record' and a 'Housing Record'. We will change the one record that CSPro generated to 'Person Record', then add the 'Housing Record'.

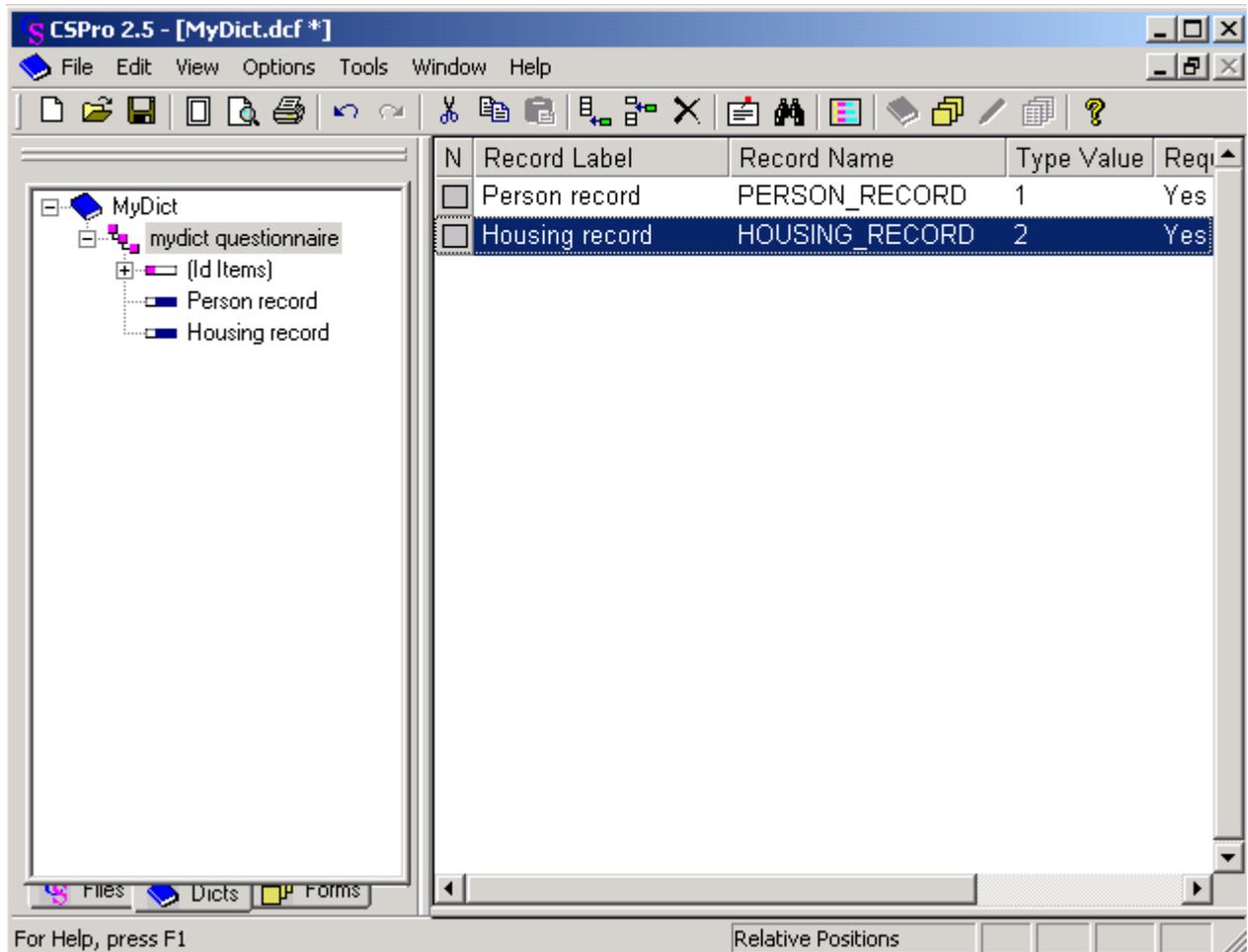
First, we will change the one record that CSPro generated to 'Person Record':

- Right-click on 'MyDict record' on the tree on the left, then select **Modify Record**.
- Type "Person record" as the Record Label, then press Enter.
- Type "PERSON_RECORD" as the Record Name, then press Enter.
- Press Enter to leave the Type value as is.
- Press 'N' to change **Required** from Yes to No, then press Enter. Our application can have households with no people, so Person records are not required for us.
- Our application can have up to 10 people in a household, so type "10", then Enter, to change **Max** and complete the changes to this record.

Next we will add the 'Housing Record':

- Right-click on Person Record on the tree on the left, then select **Add Record**.
- Type "Housing Record" as the Record Label, the press Enter.
- Press Enter to accept 'HOUSING_RECORD' as the **Record Name**.
- Press Enter to leave the **Type value** as is.
- Press Enter to leave **Required** Yes.
- Press Enter to leave **Max** 1 and start a new record.
- Press Esc on the blank record to finish making these changes.

When you have completed this step the screen should look something like:



Continue to the next step.

Step 3: Create the Items

[Exercise 2, Create the Data Dictionary]

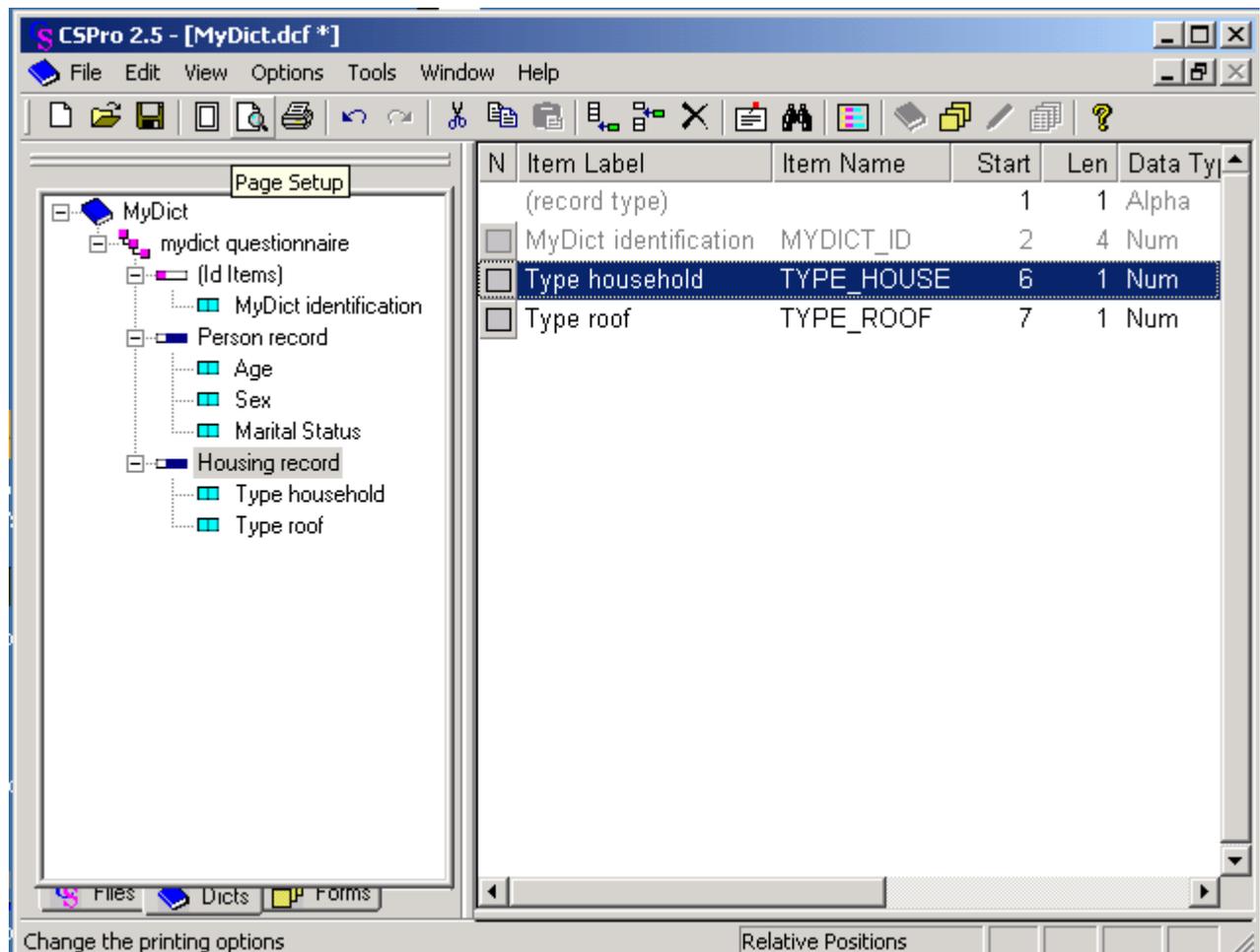
First, we will create the items 'Age', 'Sex', and 'Marital Status' in the Person record.

- Right-click on 'Person Record' on the tree, then select **Add Item**.
- Enter "Age" as the **Item Label**, then press Enter.
- Press Enter to accept AGE as the **Item Name**.
- Press Enter to accept the **Start** position.
- Type "2" then Enter to indicate that Age takes up two characters. This is because in our application we have chosen to enter ages only up to 99.
- Press Enter six times to accept the rest of the default attributes for Age.
- Enter the attributes for the Sex item. After you type in the label and name, you can keep pressing Enter to accept all the other default attributes.
- Enter the attributes for the Marital status item. After you type in the label and name, you can keep pressing Enter to accept all the other default attributes.
- Press Esc to finish creating the items.

Next, we will create the 'Type household' and 'Type roof' items in the Housing record.

- Right-click on 'Housing Record', then select **Add Item**.
- Enter the attributes for the 'Type Household' item. After you type in the label and name, you can keep pressing Enter to accept all the other default attributes.
- Enter the attributes for the 'Type Roof' item. After you type in the label and name, you can keep pressing Enter to accept all the other default attributes.
- Press Esc to finish creating the items.

When you have completed this step the screen should look something like:



Continue to the next step.

Step 4: Create Values for the Items

[Exercise 2, Create the Data Dictionary]

Value sets define what data values we expect for a data item. Value sets are used to define ranges of valid values during data entry and to define categories for cross tabulation.

First, we will create a value set for 'Age'. We will use ten year age groups.

- Click on the '+' next to 'Person record' to make sure its items are showing on the tree.
- Right-click on 'Age', then select **Add Value Set**.
- Press Enter Twice to accept the default **Value Set Label** and **Value Set Name**. The cursor will drop to the line below into the **Value Label** column.
- Press Enter to skip the **Value Label**.
- Type "0" as the **From** value, then Enter.
- Type "9" as the **To** value, then Enter twice, skipping over the **Special** column.
- Press Enter again to skip the **Value Label**.
- Type "10" as the **From** value, then Enter.
- Type "19" as the **To** value, then Enter twice, skipping over the **Special** column.
- Continue in this fashion until you have reached 90-99.

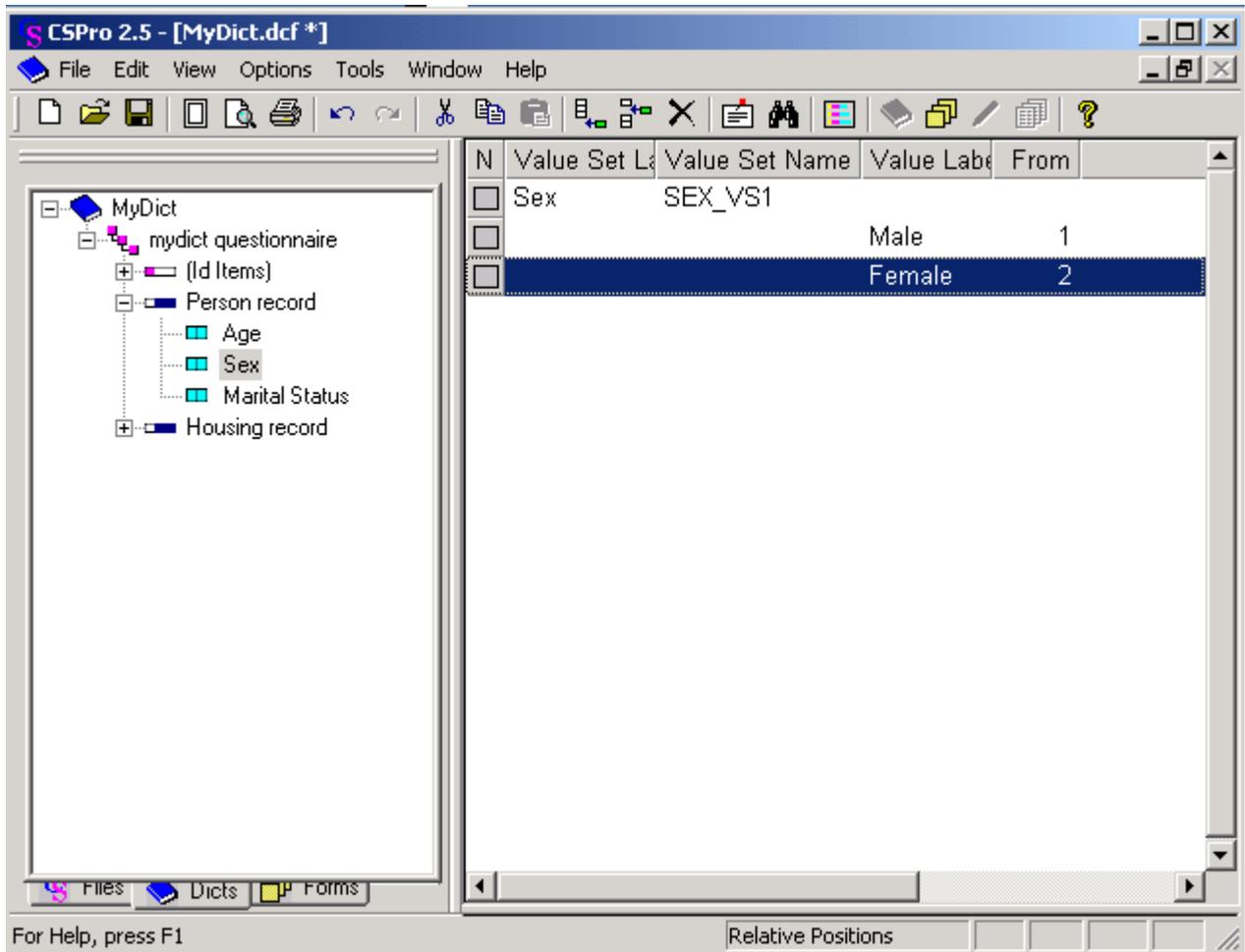
Next, we will create a value set for 'Sex'.

- Right-click on 'Sex', then select **Add Value Set**.
- Press Enter twice to accept the default **Value Set Label** and **Value Set Name**. The cursor will drop to the line below into the **Value Label** column.
- Type "Male" as the first **Value Label**.
- Type "1" as the **From** value.
- Press Enter twice to skip over the **To** and **Special** columns
- Type "Female" as the second **Value Label**.
- Type "2" as the **From** value.
- Press Enter twice to skip over the **To** and **Special** columns
- Press Esc to finish creating the value set.

To finish up:

- Add a value set for 'Marital Status'. Use '1' for Married and '2' for Not married.
- Add values for the 'Housing Record' items from the housing information in the questionnaire.
- VERY IMPORTANT: Now save the work you have done so far. Select **File/Save** from the main menu, or click  on the toolbar.

When you completed this step, the screen might look something like:



This completes this exercise. Continue to the next exercise.

Exercise 3: Create the Data Entry Forms

Step 1: Place ID and Housing Items on Form

[Exercise 3, Create the Data Entry Forms]

We will now switch from the data dictionary to the forms.

IMPORTANT NOTE: Generally it is a good idea to make the data entry forms look just like the questionnaire itself. We can easily do this in CSPro. However, in order to show you more features and save time, we will not do so.

We will place the dictionary items on the data entry form.

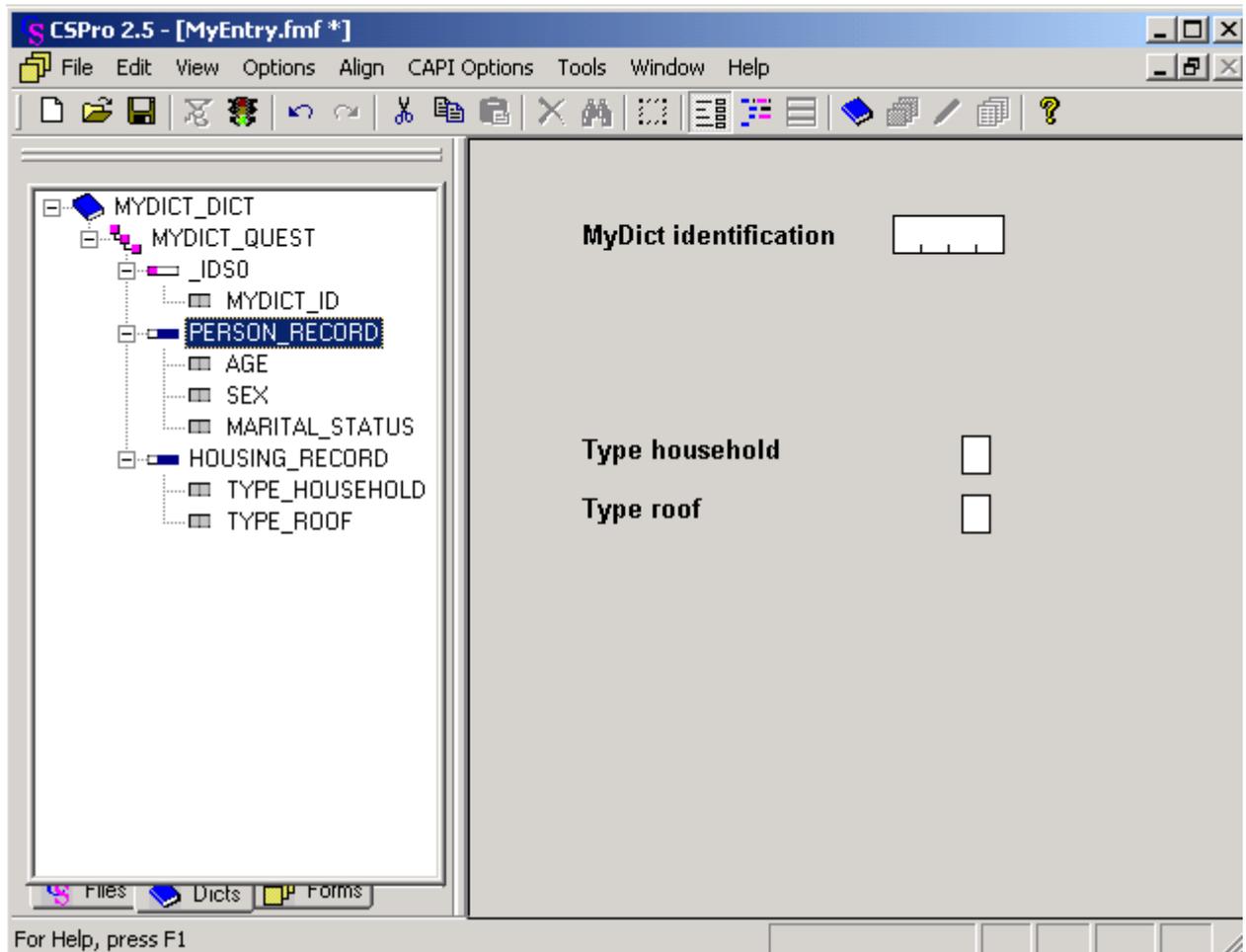
- Click  on the toolbar. A blank gray form will appear on the right hand side of the screen.
- Make sure the items on the tree are expanded so you can see them all. If any item has a '+' sign next to it, click on the '+' sign.

- Drag and drop 'MyDict identification" from the tree to the top of the form. (Click on 'MyDict identification' and hold the mouse button down while you move the mouse to the top of the form, then release the mouse button.)
- Drag and drop 'Housing Record" from the tree to the form, underneath ID_ITEM.

Next, we will line things up.

- Multi-select the three pieces of text. Hold down the Ctrl key and click on 'Id Item', then click on 'Type household', click on 'Type roof', then release the Ctrl key.
- Select **Align/Left** from the main menu.
- Multi-select the three data entry boxes.
- Select **Align/Right**.

When you have completed this step the screen should look something like:



Continue to the next step.

Step 2: Add Text and Boxes

[Exercise 3, Create the Data Entry Forms]

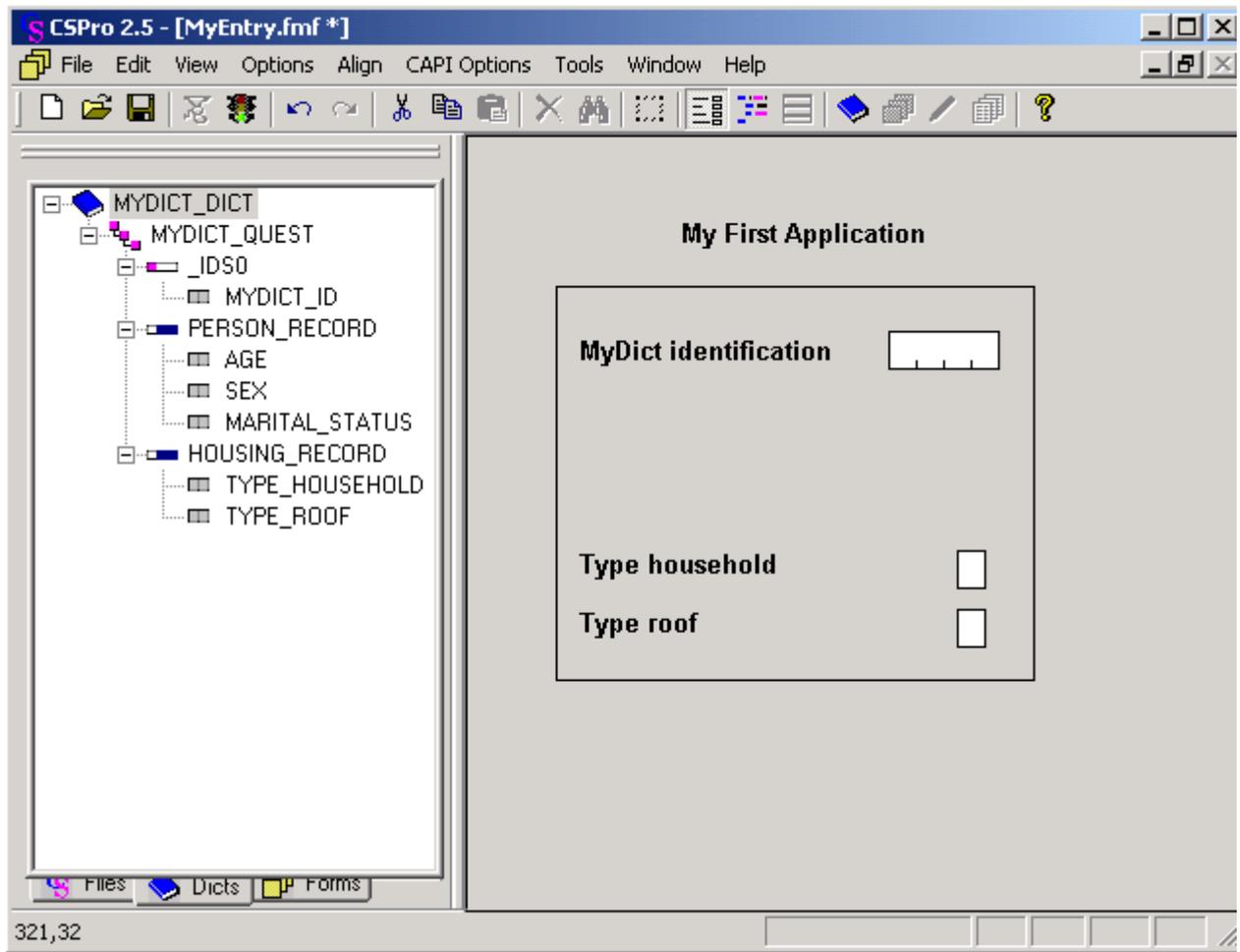
First, we will add our own line of text at the top of the screen.

- Right-click on the form, somewhere above 'Id Item'.
- Select **Add Text** from the menu.
- Type "My First Application", then Enter (or click on **OK**).
- Adjust the position of the text until it is just where you want it. To do this, select the text (click on it) and use the arrow keys, or drag and drop the text to the new location.

Next we will draw a box around the data entry fields.

- Click  on the toolbar. A small toolbar will appear floating over the screen.
- Click on the box second to the right of the floating toolbar.
- Position the mouse pointer above and to the left of 'Id item'.
- Left-click and hold the button down.
- Drag the mouse toward the right and down.
- When the box looks the way you want it, release the mouse button.
- Click  again on the main toolbar to close the floating toolbar.

When you have completed this step the screen should look something like:



Continue to the next step.

Step 3: Generate Forms Automatically

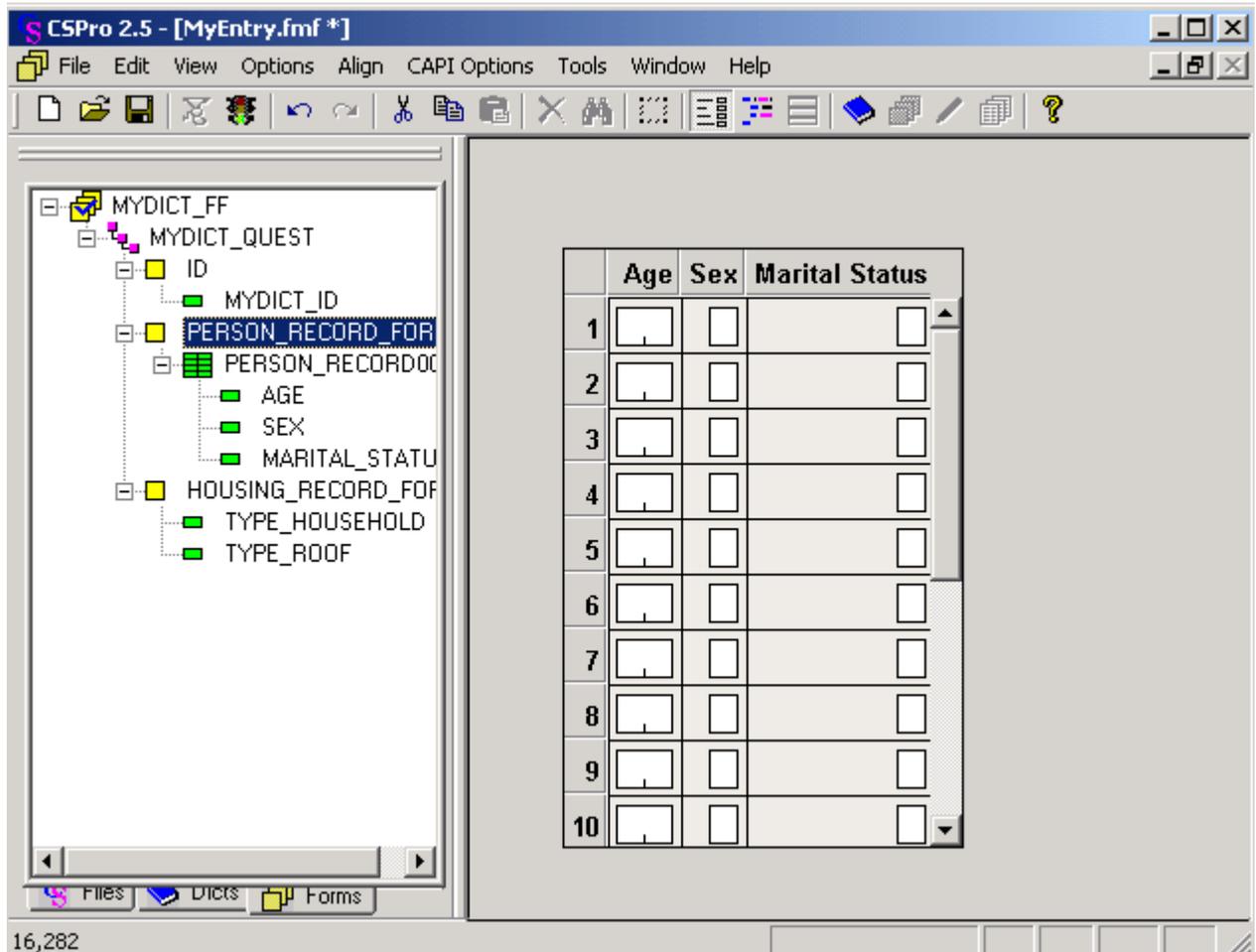
[Exercise 3, Create the Data Entry Forms]

CSPro allows you to generate a complete set of forms, which include all the items in the data dictionary, in one operation. We will use this feature now in order to save time.

- Select **Edit/Generate Forms** from the main menu, or press Ctrl-G.
- CSPro will warn you that the forms you made in steps 1 and 2 will be replaced. Click on **Yes** to continue.
- The **Drag Options** dialog box will appear. Make sure the Roster Options has **Horizontal** selected. Click on **OK** to close the **Drag Options** dialog box.
- Note that the tree on the left shows that you now have three forms. Open up the entire tree by clicking the '+' next to any part of the tree.
- Click on PERSON_RECORD_FORM on the tree. You will see the roster that CSPro created for you.

- Click around on the tree on the left as you like to explore the forms that CSPro created.
- VERY IMPORTANT: Now save the work you have done so far. Select **File/Save** from the main menu, or click  on the toolbar.

When you have completed this step the screen should look something like:



This completes this exercise. Continue to the next exercise.

Exercise 4: Enter Data

Step 1: Run the Data Entry Application

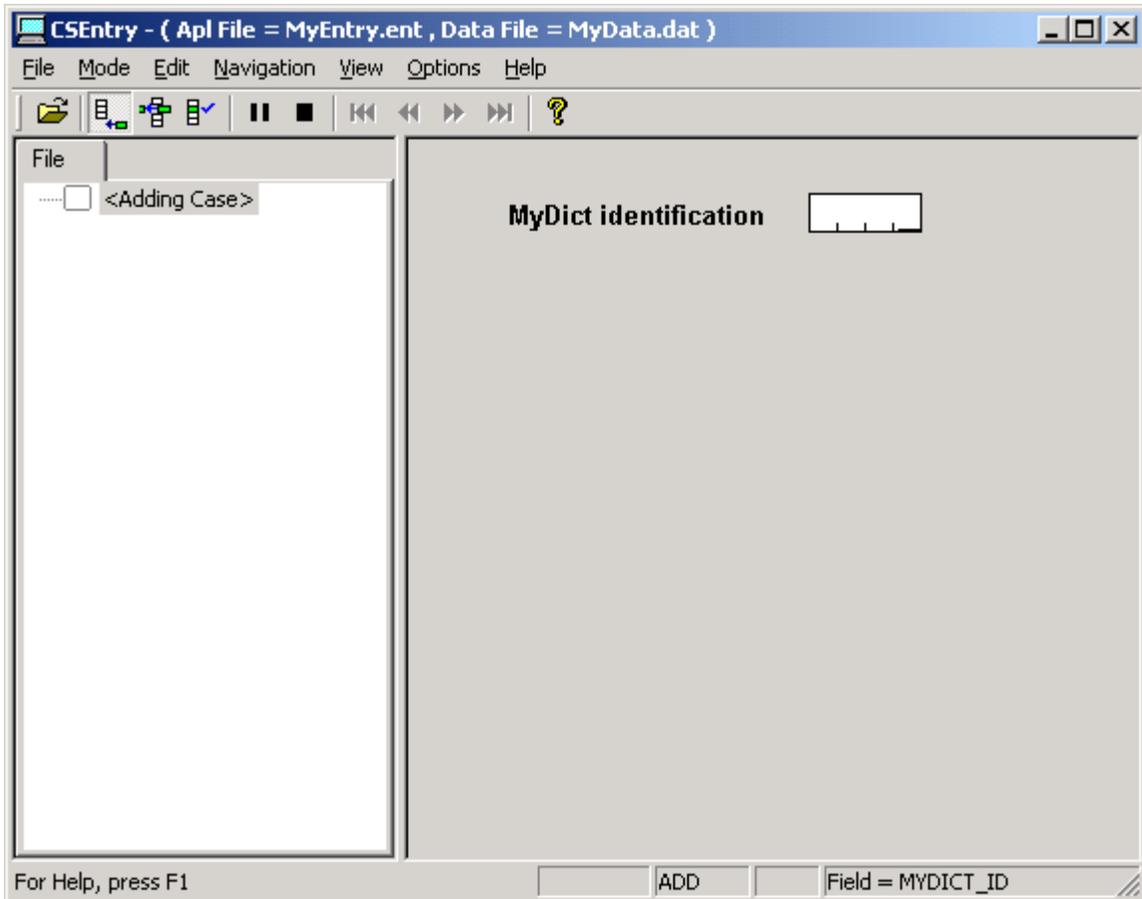
[Exercise 4, Enter Data]

Your data entry application is now ready to run! CSEntry is the name of the program that runs this application, allowing you to key in data.

- Run CSEntry by clicking  on the toolbar, or pressing Ctrl-R. (CSPro will ask you to save your work if you haven't already done so. Click Yes.)

- CSEntry will ask you to select a data file. The data we key will go into this file. Change to the folder you created for this set of exercises, "c:\CSProTutorial". Type "MyData.dat" for the file name, then press Enter.
- CSEntry will ask if you want to create a new file. Click **Yes**.
- CSEntry will ask for your **Operator ID**. You may type in anything you like.
- The first data entry form will appear with the cursor ready for you to begin entering data.

When you have completed this step the screen should look something like:



Continue to next step.

Step 2: Begin to Add a Case

[Exercise 4, Enter Data]

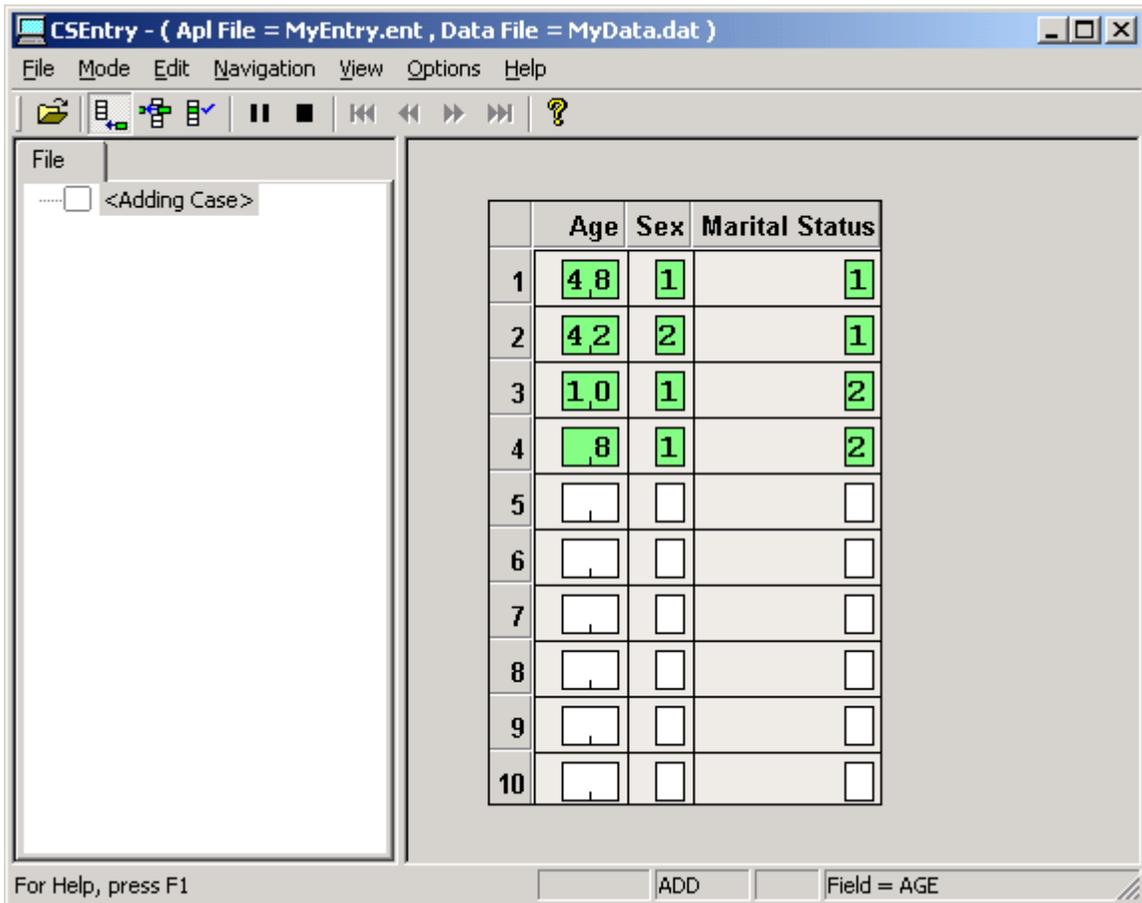
We will now type in the data for our first case (questionnaire). We will use a fictitious family of four.

- Type "1" then Enter to fill in the id item. The next form will appear, showing the person roster.
- Type "48" in the 'Age' field. The cursor will move to the 'Sex' field.

- Type "3" in the 'Sex' field. CSEntry will tell you this value is out of range, because it is not in the value set for 'Sex' you created in your data dictionary.
- With the **OUT OF RANGE** message still showing, type "1". The message will go away and the cursor will move to the 'Marital Status' field.
- Continue typing in data for the family as shown below.

Tips:

- You can move backward to the previous field using Shift-Tab, left arrow or up arrow.
- You can move forward to the next field using Enter, Tab, right arrow or down arrow.
- You can change a field by simply typing a new number into it.
- You can erase a field using the space bar.



Continue to next step.

Step 3: Finish Adding a Case

[Exercise 4, Enter Data]

We will now tell the roster that we have finished entering people.

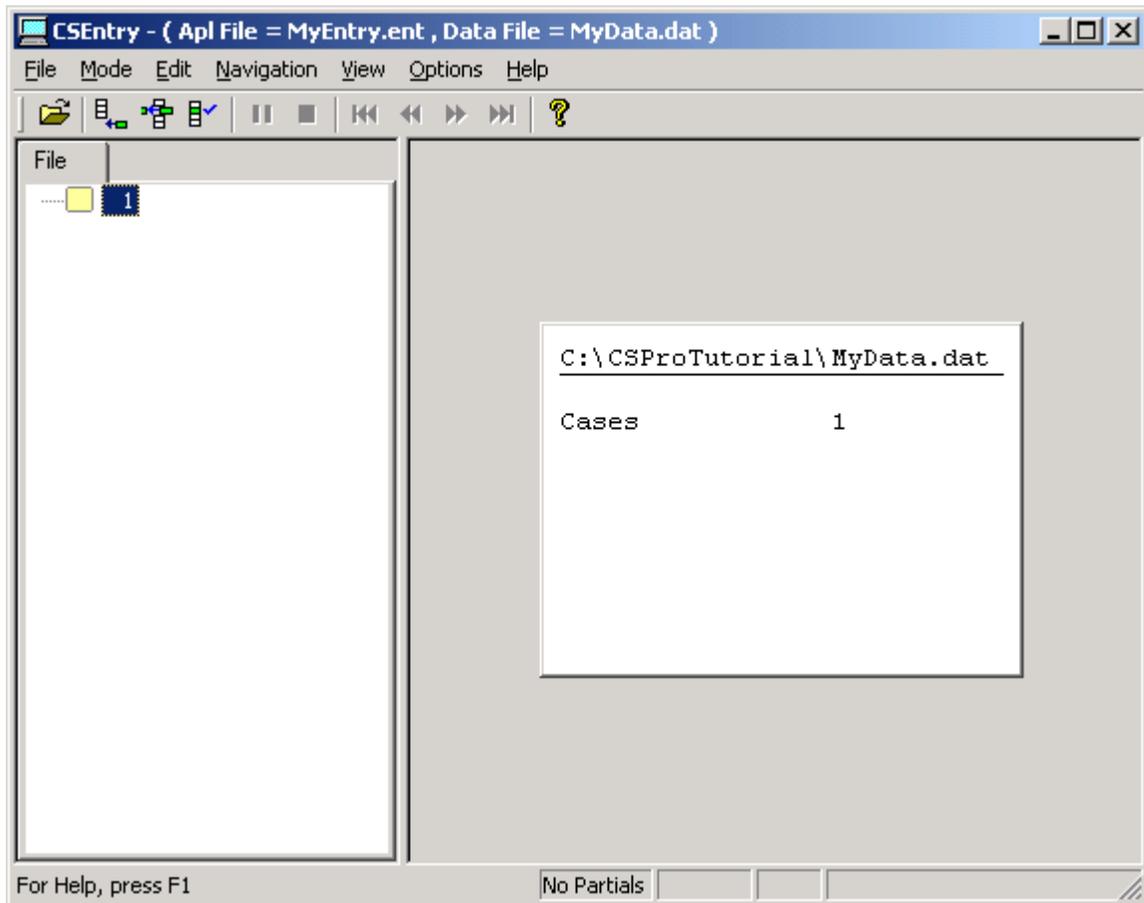
- Hold down the Ctrl key.

- Press the slash key (‘/’) on the numeric keypad. The next form will appear on the screen. If you have trouble finding this key combination, which could be the case on some laptops, you can select **Functions/End Group** from the main menu.

Next we will type in the household form and end the case.

- Type "1" in the 'Type Household' field.
- Type "1" in the 'Type Roof' field.
- CSEntry will ask us to accept the case. At this point you can select **No** and go back and make changes to the data in the case if you like. If you are satisfied that the data are correct, press Enter or select **Yes**.
- CSEntry will now show the first form again, with the cursor ready for you to type in another case. We will now stop adding cases. Click the  on the toolbar, or press Esc or Ctrl-S, or select **Mode/Stop** from the main menu.

When you have completed this step the screen should look something like:



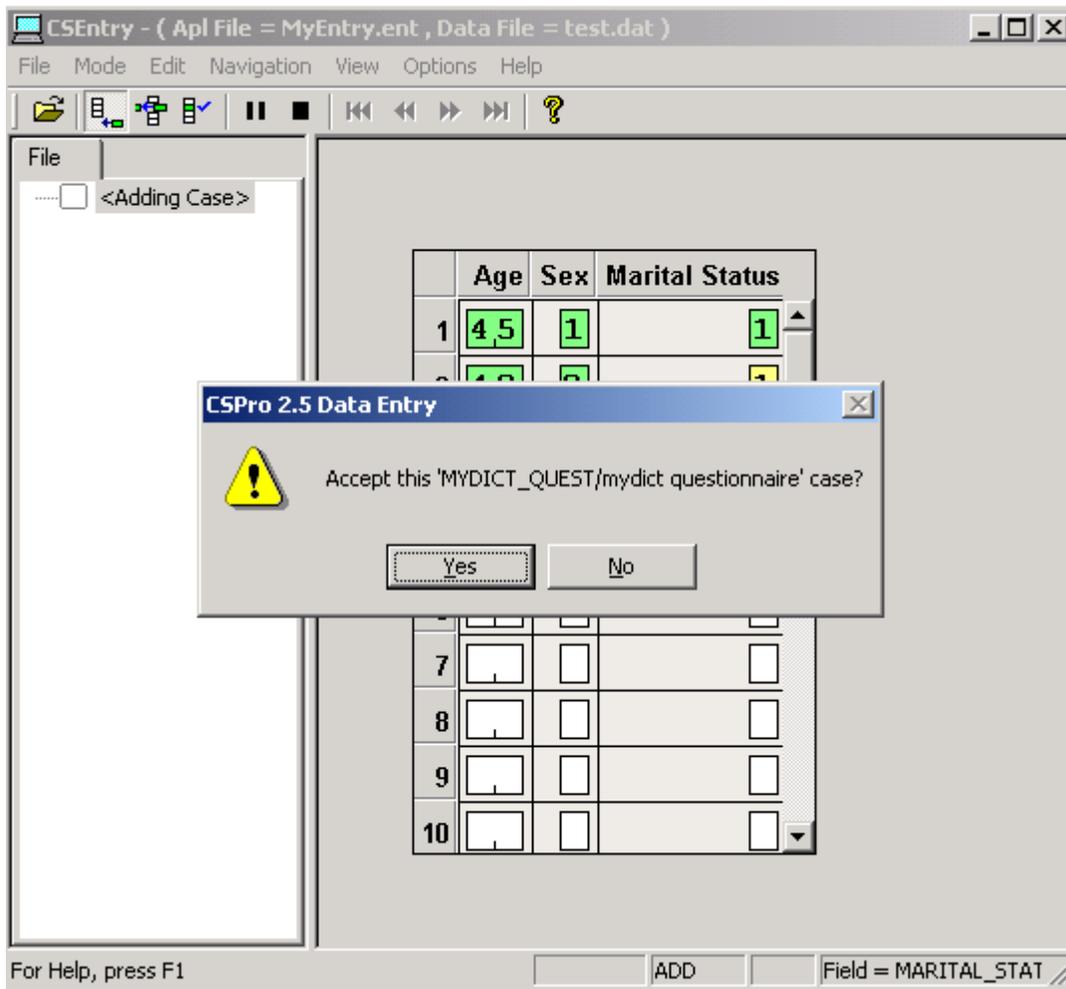
Continue to next step.

Step 4: Modify a Case

[Exercise 4, Enter Data]

Now we realize that the first person in the household is really 45 years old and not 48 as we typed in. We will go back into the data and change this value.

- Click on  on the toolbar, or press Ctrl-M to enter Modify mode. You should see the first form, with the value '1' showing for 'Id item'.
- Press the PgDn key to advance to the next form.
- Type "45" in the 'Age' field.
- Press F12 to indicate that you have finished making your changes.
- The screen will now look something like the picture below. CSEntry will ask you to accept the case, like it did in the previous step. Select **Yes**.
- CSEntry will save your changes and exit from Modify mode.
- Close CSEntry by clicking on the X in the top right corner, or selecting **File/Exit** from the main menu.



This completes this exercise. Continue to next exercise.

Exercise 5: Tabulate Data

Step 1: Create a Cross Tabulation Application

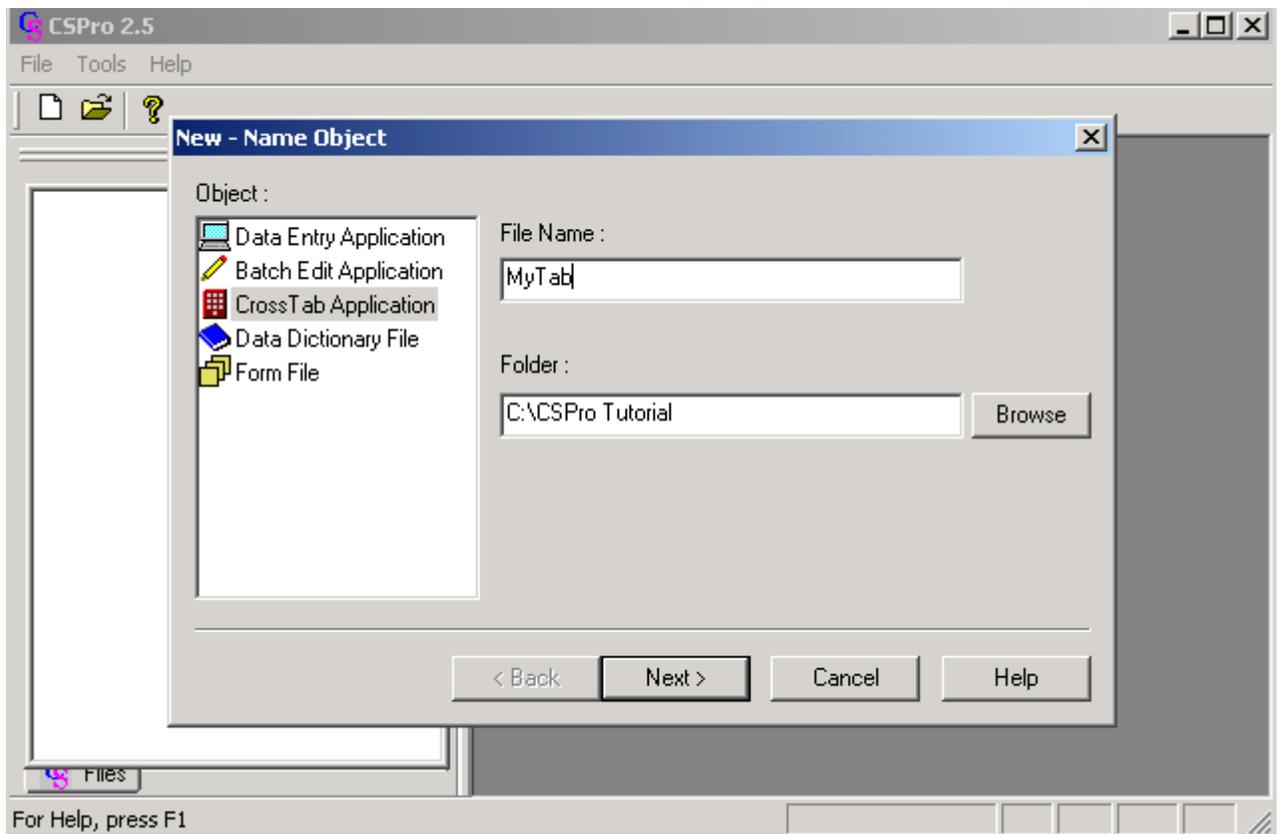
[Exercise 5, Tabulate Data]

In this exercise we will perform a simple cross tabulation of the data you entered in the previous exercise. We will not use the other features of CSPro cross tabulation.

If you still have your data entry application open from previous exercises, close it now. Select **File/Close** from the main menu. CSPro may prompt you to save changes. Select **Yes**.

We will now create a cross tabulation application using the Wizard, as we did in Exercise 2.

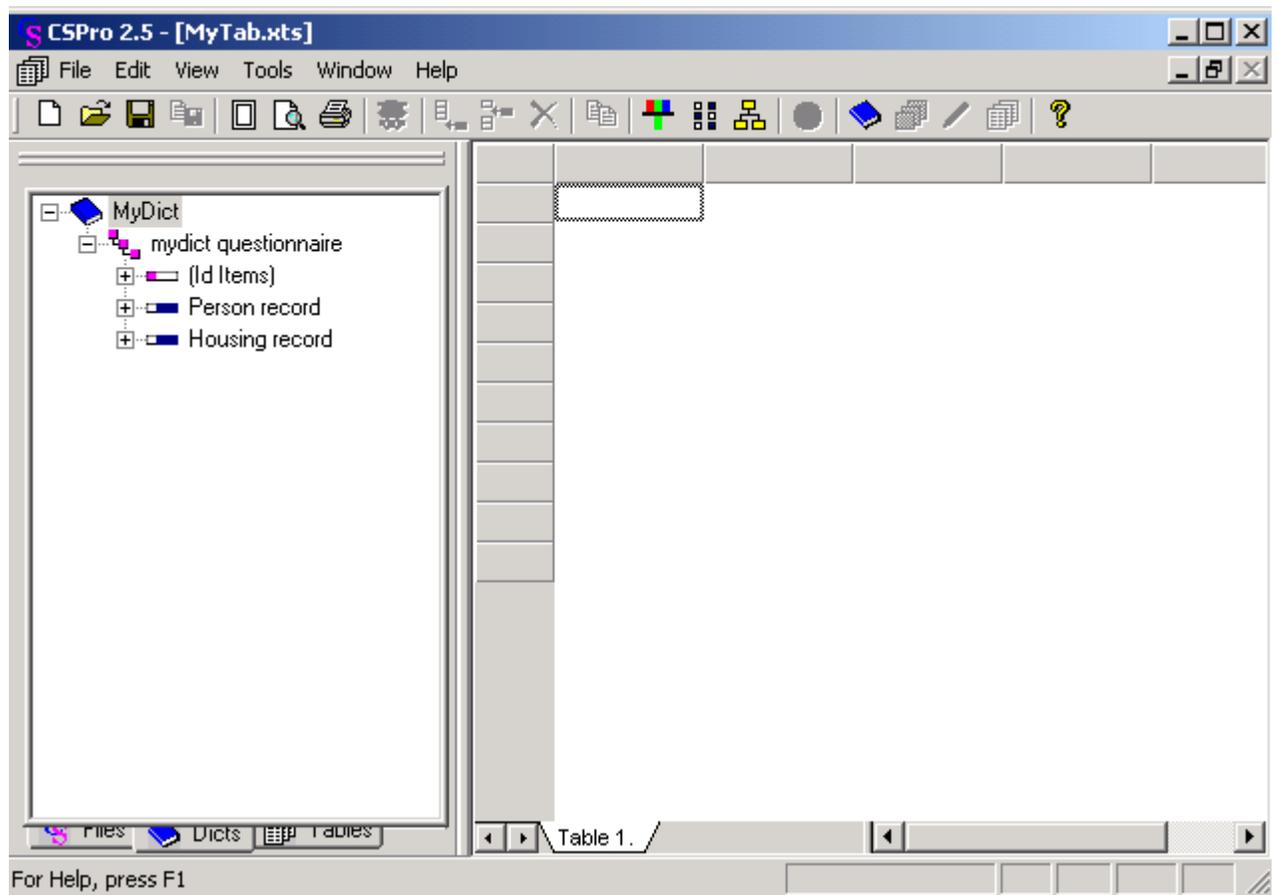
- Select **File/New** from the main menu, or click  on the toolbar.
- Click on **CrossTab Application**.
- Enter "MyTab" as the file name for the application.
- Enter the Folder name you created for these exercises ('c:\CSProTutorial').



- Click on **Next**.
- The next screen will ask you select the data dictionary. Enter "c:\CSProTutorial\MyDict.dcf", it's not already there, then click **Next**.
- You should see the checkered flag. Click **Finish** and you're done!

You are now ready to begin designing your tabulation.

When you have completed this step the screen should look something like:



Continue to next step.

Step 2: Select Items to Tabulate

[Exercise 5, Tabulate Data]

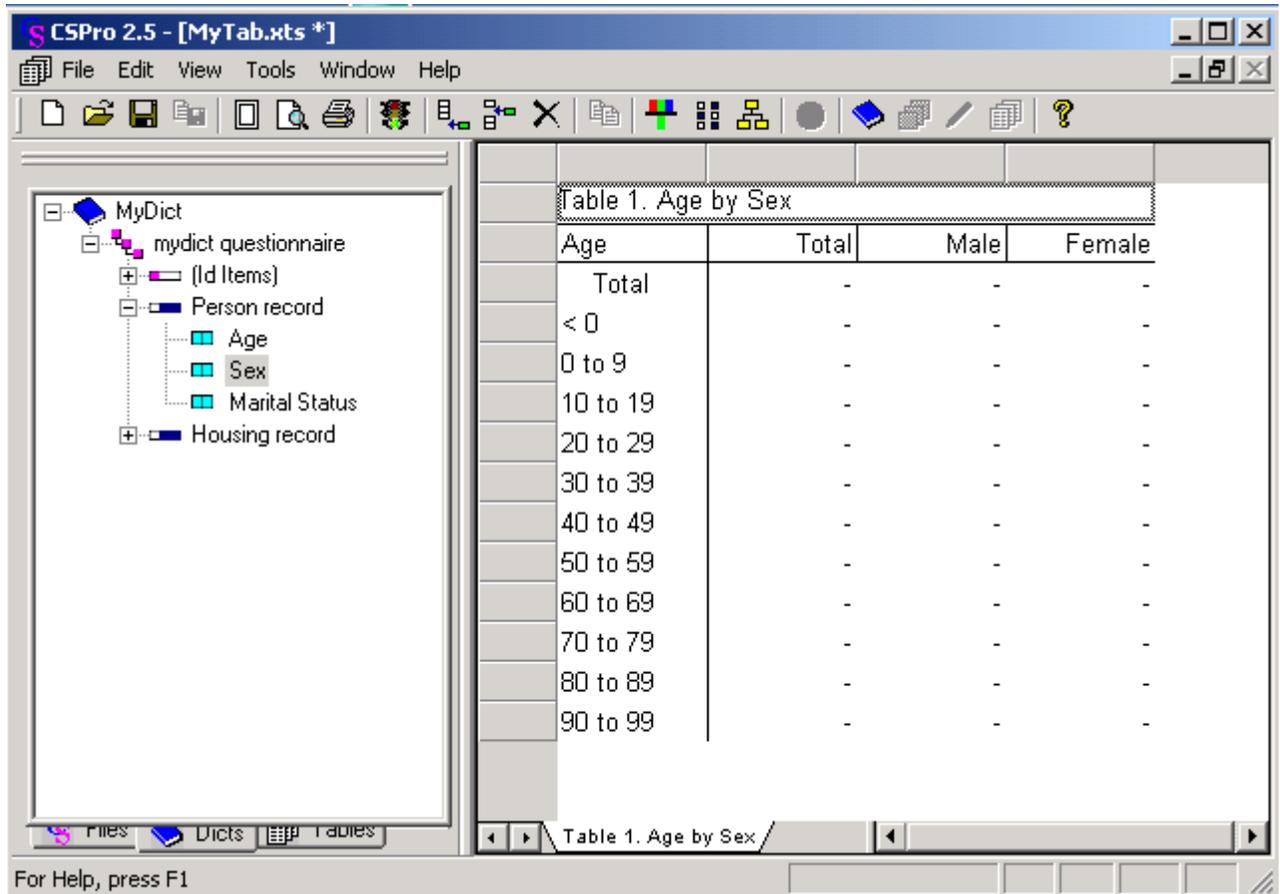
We will create a tabulation of Age by Sex. Age will appear as the rows and Sex as the columns.

- Click on the '+' next to 'Person record' to make sure its items are showing on the tree.
- Drag and drop 'Age' from the tree to the left side of the table. (Click on 'Age' and hold the mouse button down while you move the mouse to the side of the table then release the mouse button.) The drop point should be in the white space next to one of the gray boxes along the side.
- Drag and drop 'Sex' from the tree to the top of the table. (Click on 'Sex' and hold the mouse button down while you move the mouse to the top of the table then release the mouse button.) The drop point should be in the white space just under one of the gray boxes along the top.

Tips:

- The item you drag from the dictionary tree will become either a row item or a column item depending on where you drop it. Imagine a diagonal line from the top left to the bottom right of the table. An item dropped on the left/under that line becomes a row item. An item dropped on the right/above that line becomes a column item.
- You can remove an item from the table by clicking on any of its associated labels then dragging and dropping it back to the dictionary tree, or by right-clicking on any of its labels and selecting 'Delete'.

When you have completed this step the screen should look something like:



Continue to next step.

Step 3: Run the Tabulation

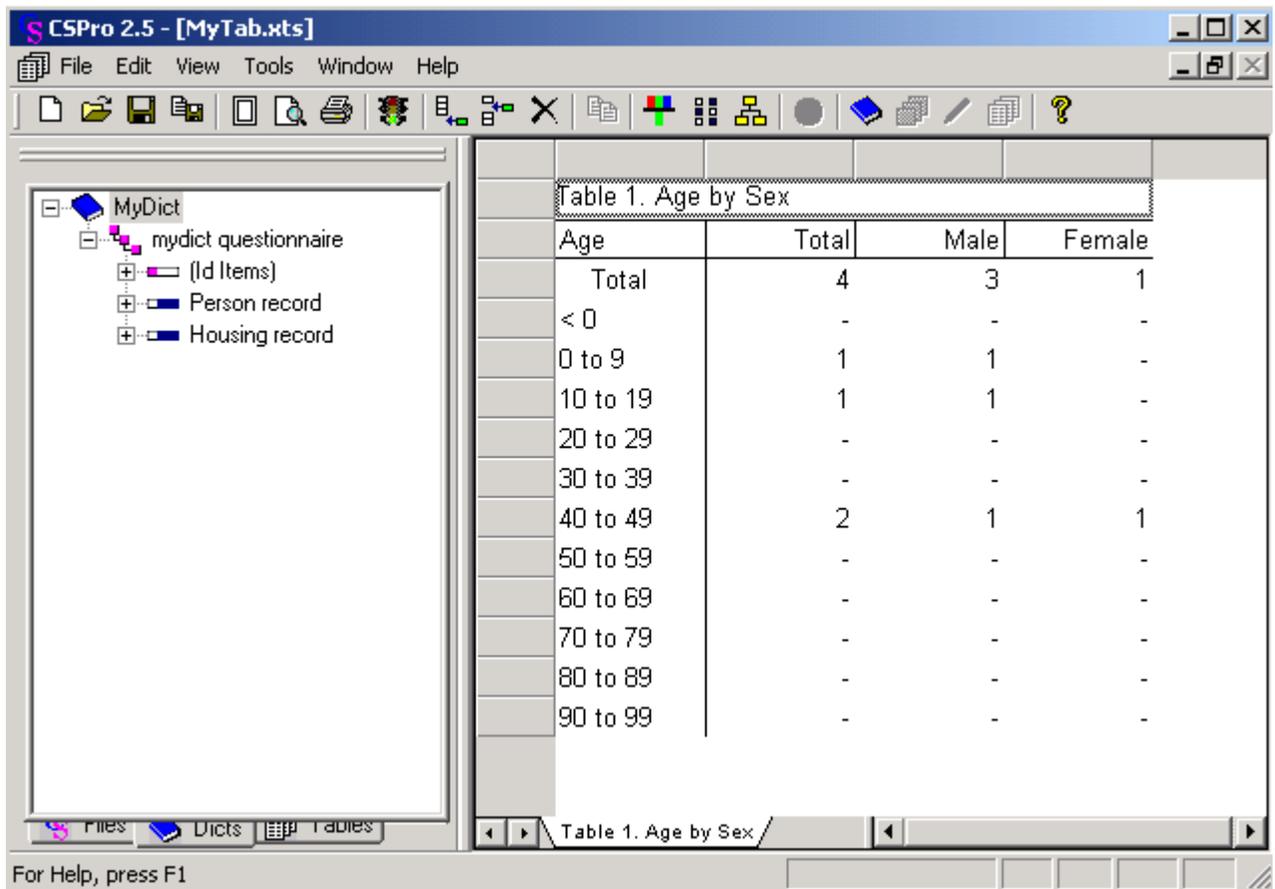
[Exercise 5, Tabulate Data]

We are now ready to run the tabulation. We will use the data file you created in the previous exercise.

- Run the tabulation by clicking  on the toolbar, or pressing Ctrl-R.
- CSPro will ask you for the data file(s) to tabulate. Select 'MyData.dat'. Make sure the dialog box is set to the folder you created for these exercises, "c:\CSProTutorial".

- The tabulated numbers will now appear in the table. That's all there is to it!

When you have completed this step the screen should look something like:



This completes this exercise. Continue to next exercise.

Exercise 6: Add Edits to the Data Entry Application

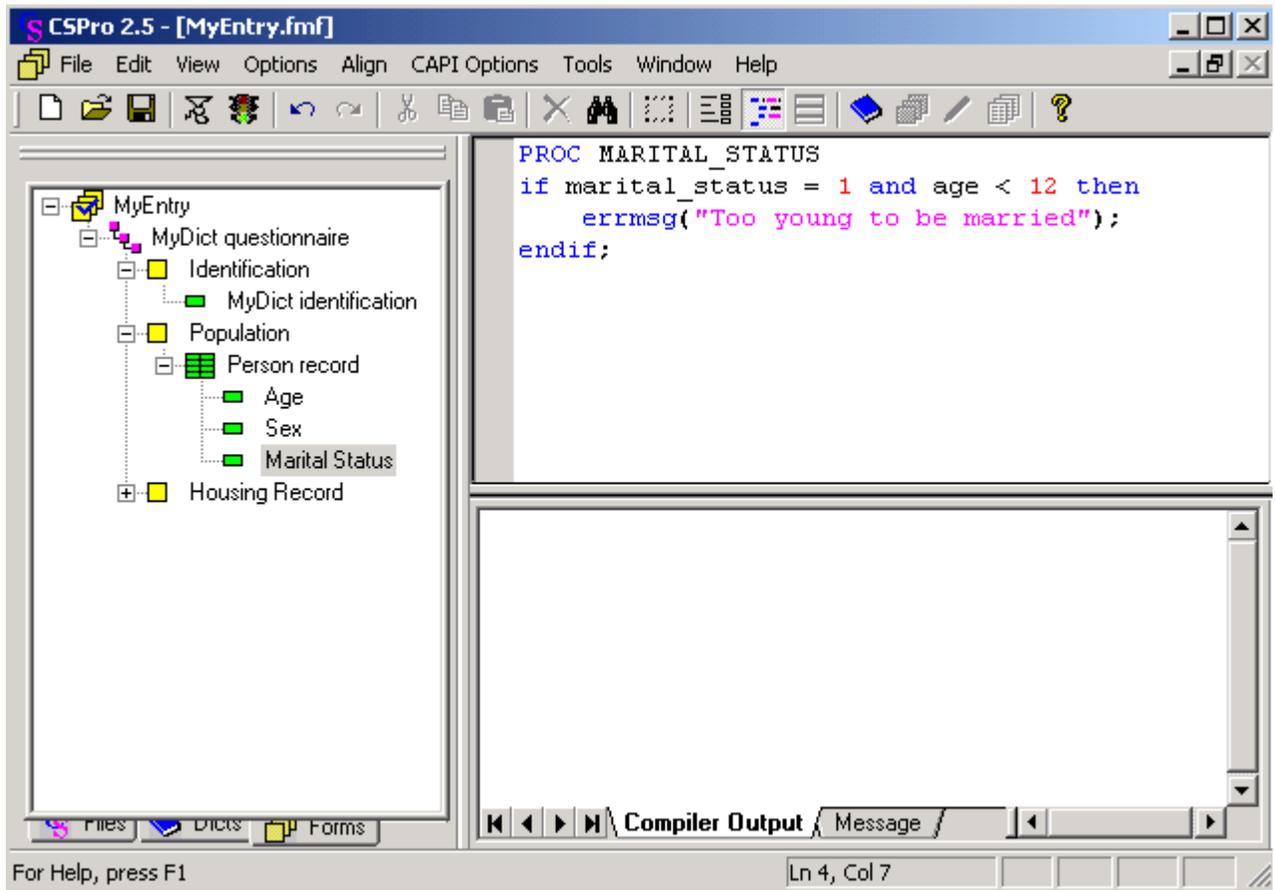
Step 1: Write Logic for the Edit

[Exercise 6, Add Edits to the Data Entry Application]

We will now return to the data entry application. We will introduce a check to make sure that married people are at least 12 years old. In our data entry application, we will perform this check immediately after the keyer enters the marital status.

- If you still have your cross tabulation application open from previous exercises, close it now. Select **File/Close** from the main menu. CSPro may prompt you to save changes. Select **Yes**.
- Open the data entry application we created earlier. Click on  on the toolbar, or select **File/Open** from the main menu. Click on the application name, MYENTRY.ENT, and click on open.

- Get ready to write logic by clicking  on the toolbar, or pressing Ctrl-L or selecting **View/View Logic** from the main menu.
 - Click on the '+' next to 'PERSON_RECORD_FORM' then click on the '+' next to 'PERSON_RECORD000' then click on 'MARITAL_STATUS'. The frame on the right hand side of the screen should show 'PROC MARITAL_STATUS' at the top.
 - Note that 'PROC' is short for procedure. We put our logic in the procedure for 'MARITAL_STATUS' because we want it to execute immediately after the operator keys this field.
 - Type in logic exactly as you see in the picture below.



Continue to next step.

Step 2: Compile the Logic

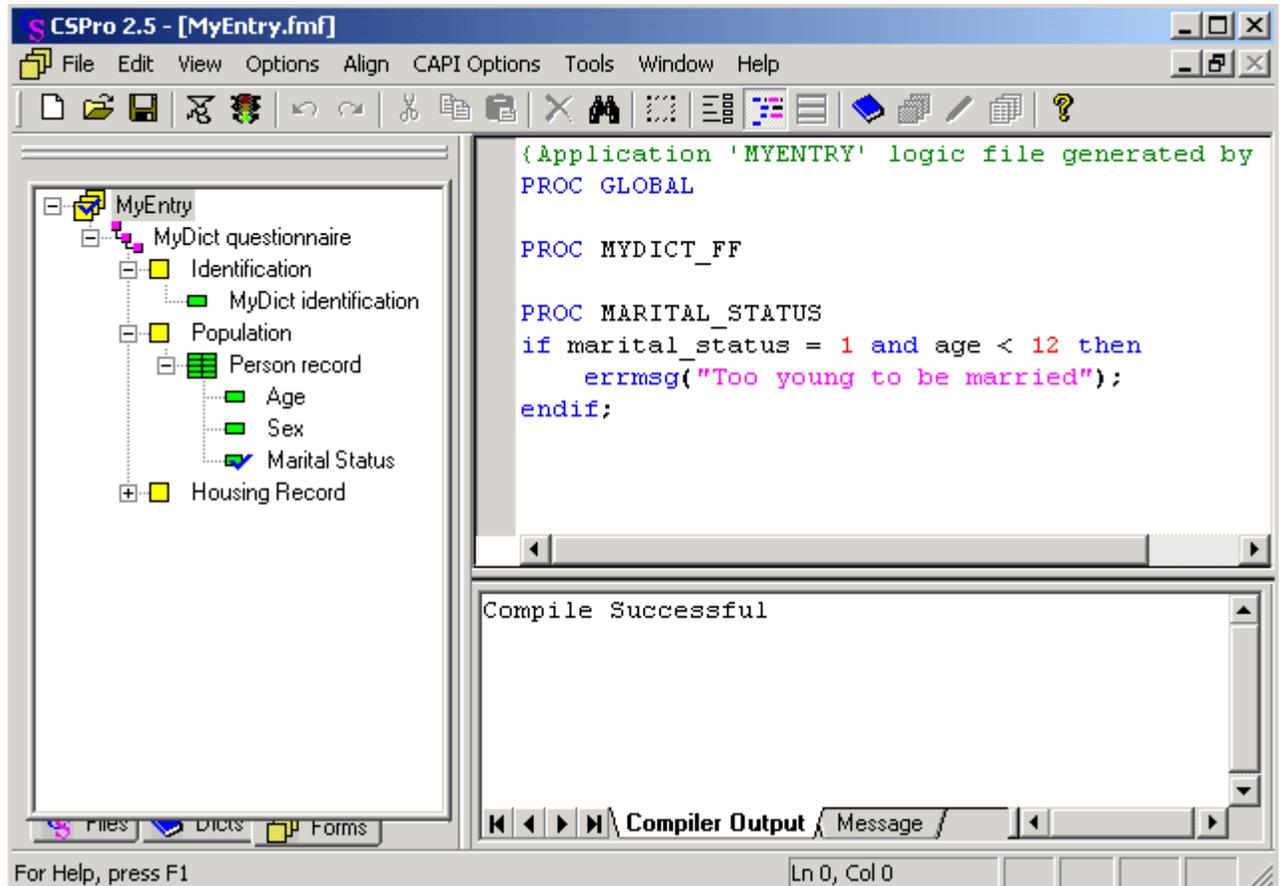
[Exercise 6, Add Edits to the Data Entry Application]

You have typed logic in the CSPro language. Like all procedural languages, the system must check to make sure there are no syntax errors. This is called compiling.

- Compile the logic by clicking  on the toolbar, or pressing Ctrl+K or selecting **File/Compile** from the main menu.

- If you typed the logic correctly, you will see **Compile Successful** in the Compiler Output under the logic.
- If you see a dialog box which says **Compile Failed**, you have typed something incorrectly. A red circle will appear in the margin indicating the approximate location of the error. The **Compiler Output** tab at the bottom of the screen will show you an error message to help you determine the error. Check very carefully to make sure you typed in exactly what was shown in the previous step.

When you have completed this step the screen should look something like:



Continue to next step.

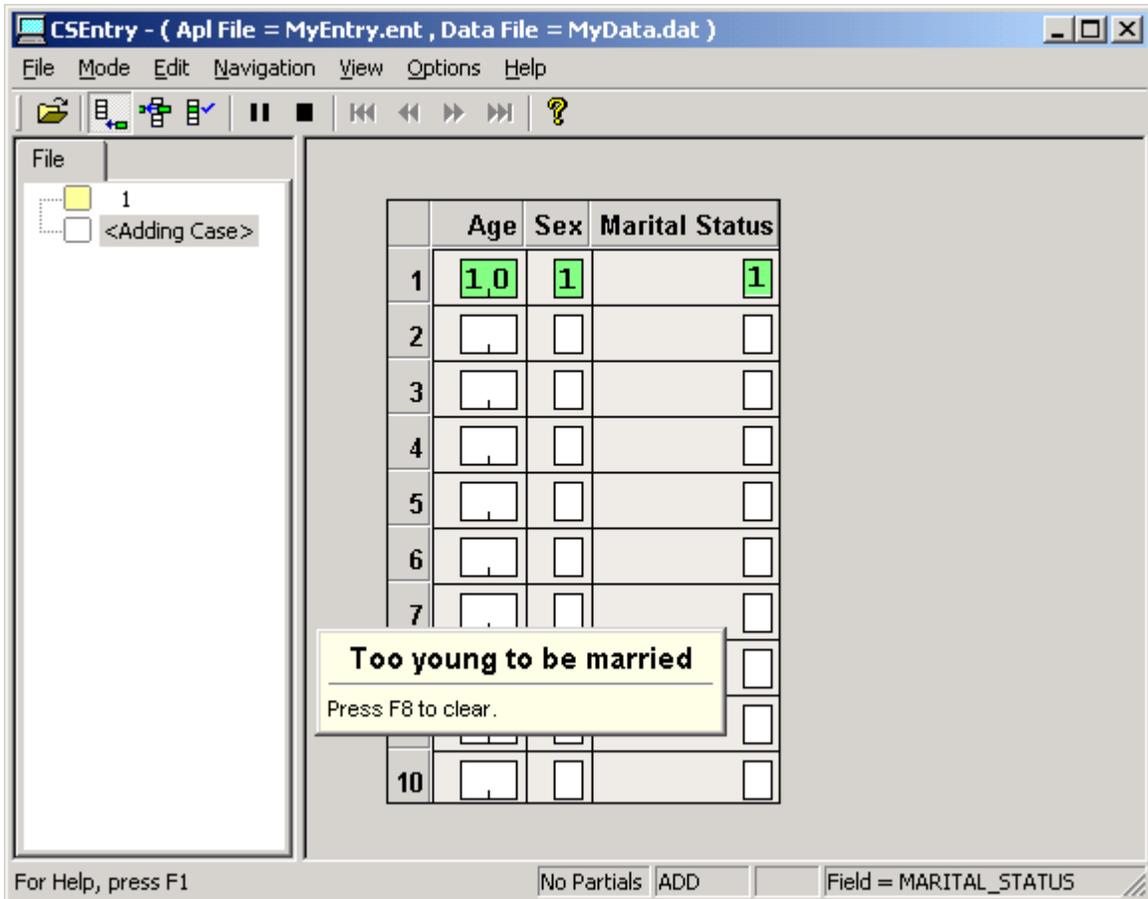
Step 3: Test the Edit

[Exercise 6, Add Edits to the Data Entry Application]

We are now ready to run the data application and make sure our logic is working properly.

- Run CSEntry by clicking  on the toolbar, or pressing Ctrl-R.
- CSPro will ask you to save the changes. Click **Yes**.
- CSEntry will ask you to select a data file. Type "MyData.dat" for the file name, if it is not already there, then press Enter.
- Type in any **Operator ID**.

- Click on  on the toolbar, or press Ctrl-A to enter Add mode. The first form will appear with the cursor on 'Id Item'.
- Type "2" then Enter to fill in the id item. The next form will appear, showing the person roster.
- Type "10" in the 'Age' field.
- Type "1" in the 'Sex' field.
- Type "1" in the 'Marital Status' field.
- Your error message should appear on the screen, as shown below.



Continue to next step.

Step 4: Complete the Case

[Exercise 6, Add Edits to the Data Entry Application]

We will finish entering data for the second case, including the error condition, so that we will be able to test that condition in the following exercise.

- Press **F8** to clear the message.
- Hold down the Ctrl key and press the slash key ("/") on the numeric keypad. The next form will appear on the screen.

- Type "1" in the 'Type Household' field.
- Type "1" in the 'Type Roof' field.
- CSEntry will ask us to accept the case. Select **Yes**.
- Click the  on the toolbar, or press Esc or Ctrl-S, or select **Mode/Stop** from the main menu.
- Close CSEntry by clicking on the X in the top right corner, or selecting **File/Close** from the main menu.

This completes this exercise. Continue to next exercise.

Exercise 7: Run a Batch Application

Step 1: Create a Batch Application

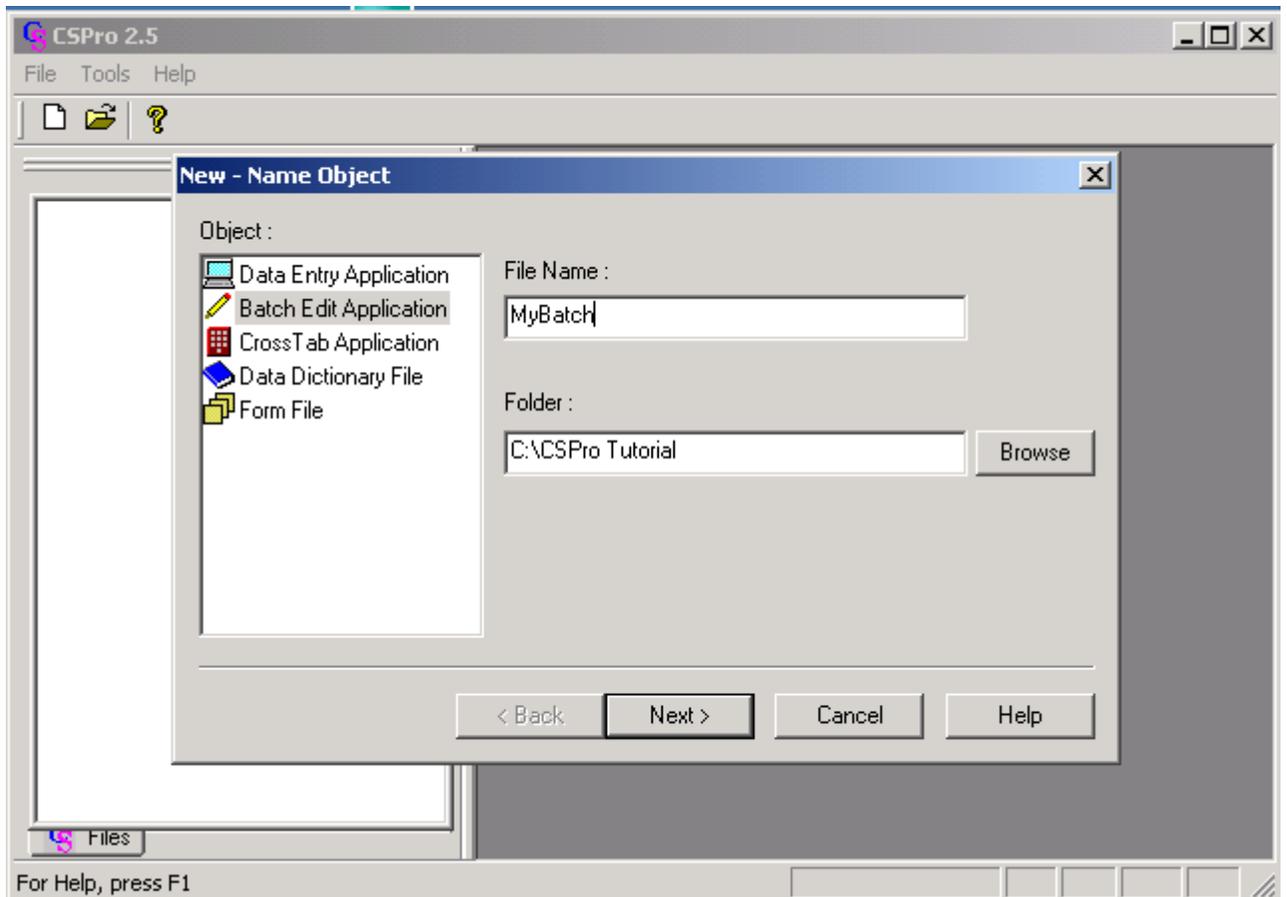
[Exercise 7, Run a Batch Application]

In the previous exercise we wrote logic to perform an edit interactively, i.e. at the time of data entry. In this exercise we will apply the same logic in a batch application, i.e. after data entry. Our logic will check the data and produce a report telling us about any errors.

- If you still have your data entry application open from the previous exercise, close it now. Select **File/Close** from the main menu. CSPro may prompt you to save changes. Select **Yes**.

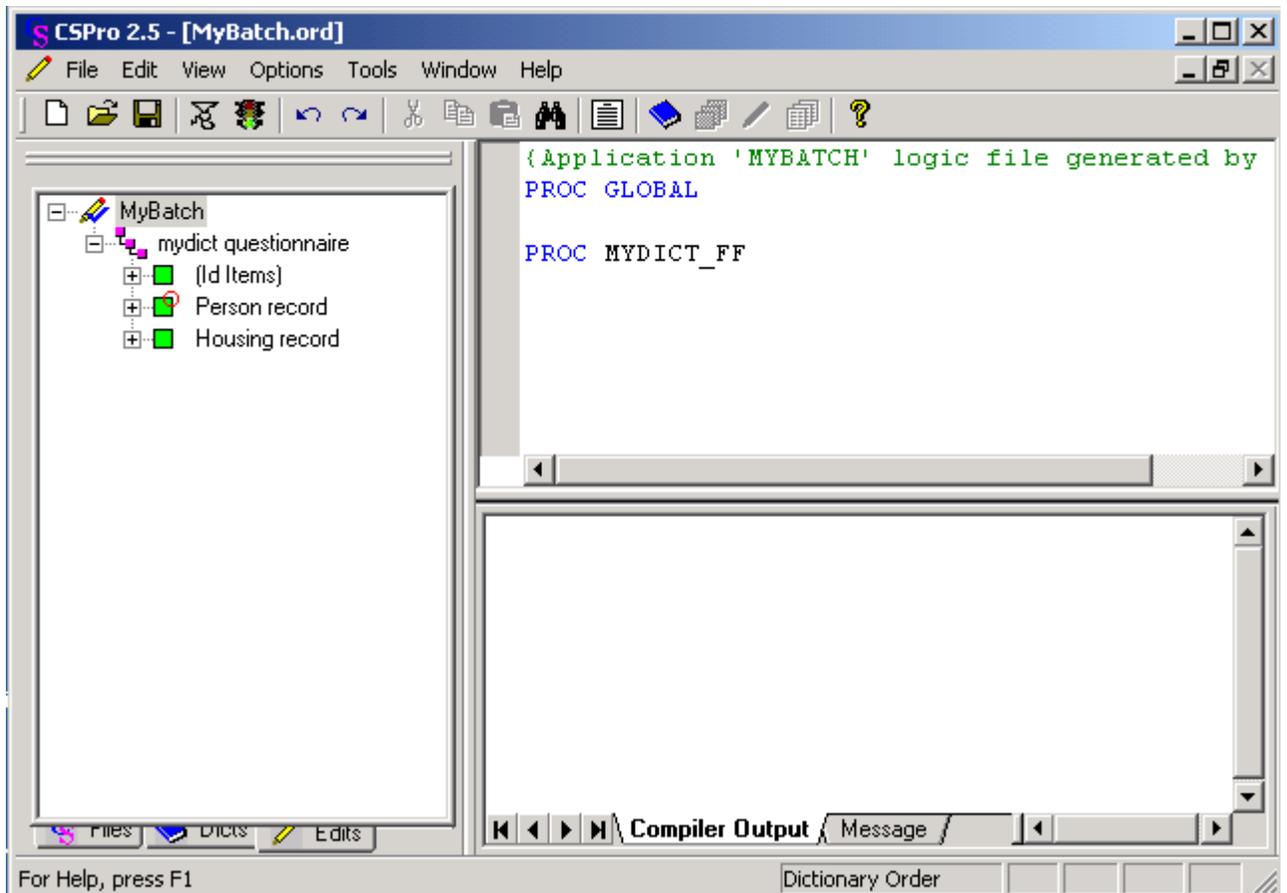
We will now create a batch application using the Wizard, as we did in Exercises 2 and 5.

- Select **File/New** from the main menu, or click  on the toolbar.
- Click on **Batch Application**.
- Enter "MyBatch" as the file name for the application.
- Enter the Folder name you created for these exercises ('c:\CSProTutorial').



- Click on **Next**.
- The next screen will ask you select the data dictionary. Enter "c:\CSProTutorial\MyDict.dcf", if it's not already there, then click **Next**.
- You should see the checkered flag. Click **Finish** and you're done!

When you have completed this step the screen should look something like:



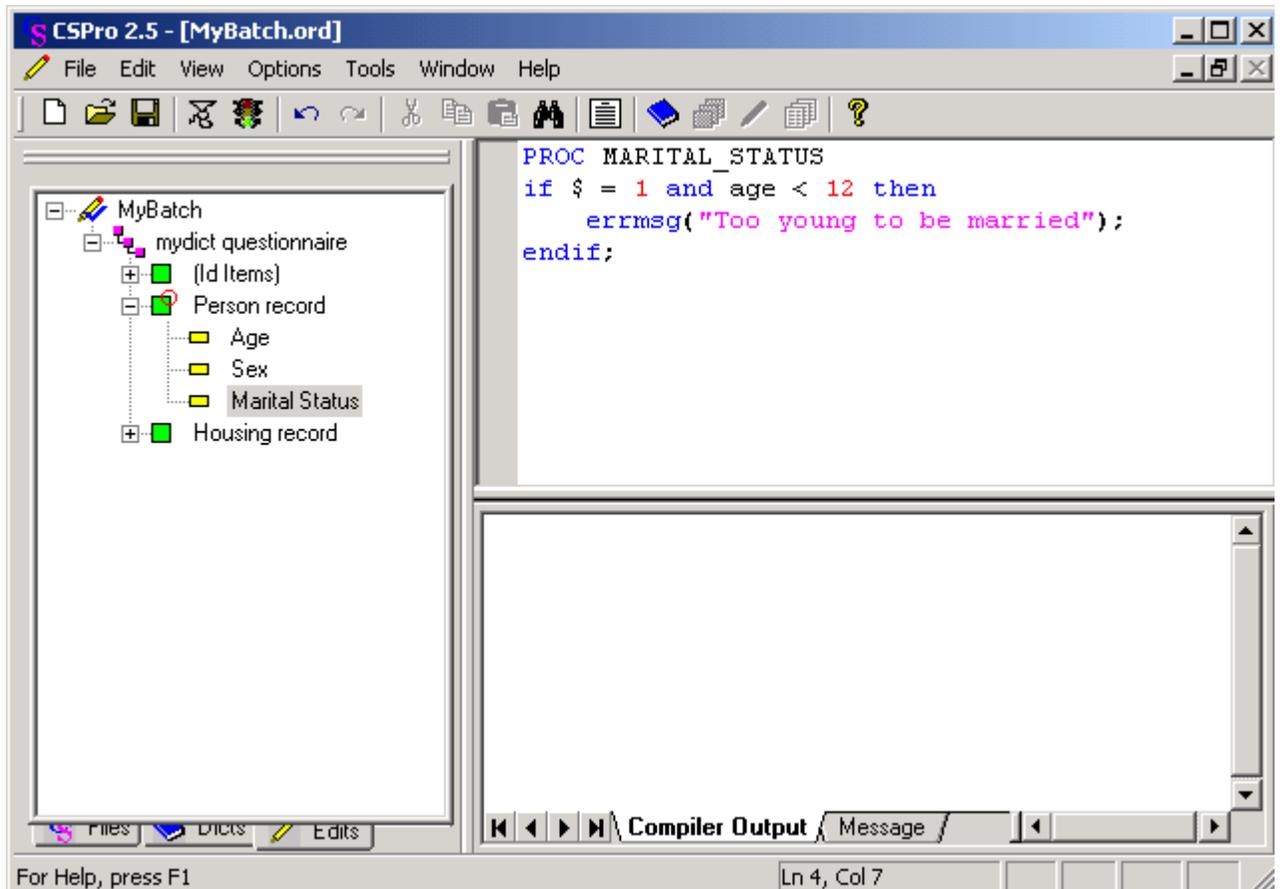
Continue to next step.

Step 2: Write Logic and Compile

[Exercise 7, Run a Batch Application]

We will write the same logic we used in the previous exercise.

- Click on the '+' next to 'PERSON_RECORD_FORM' then click on 'MARITAL_STATUS'. The frame on the right hand side of the screen should show 'PROC MARITAL_STATUS' at the top.
- Type in the logic exactly as you see in the picture below.
- Notice that we used '\$' in place of 'marital_status'. This is the same thing because the logic is inside the procedure for 'marital_status'. In the CPro language, '\$' is a short way of saying 'this item'
- Compile the logic by clicking  on the toolbar, or pressing Ctrl+K or selecting **File/Compile** from the main menu.
- Correct any errors until you see **Compile Successful**.



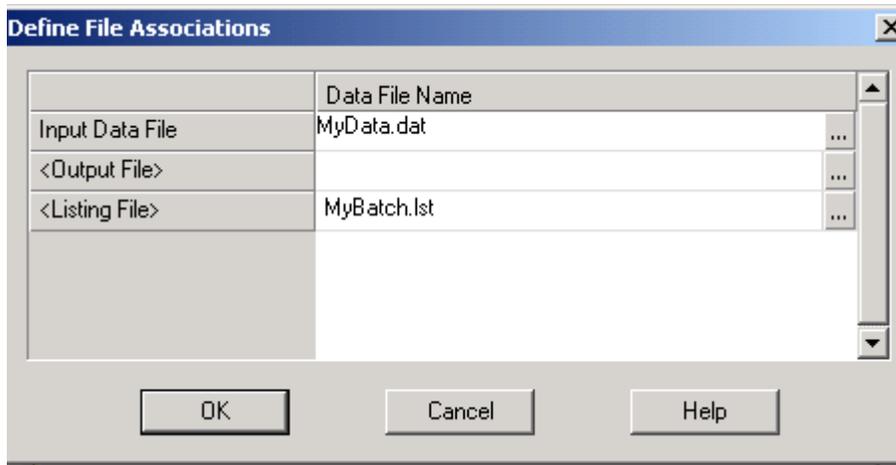
Continue to next step.

Step 3: Run the Batch Application

[Exercise 7, Run a Batch Application]

Your batch application is now ready to run. CSBatch is the name of the program that runs this application. We will use the data file you created in the previous exercise.

- Run CSBatch by clicking  on the toolbar, or pressing Ctrl-R.
- CSPro will ask you to save the changes. Click **Yes**.
- CSBatch will ask for some data file names. Click in the empty box next to 'Input Data File'. Type in "MyData.dat" and click **OK**.



CSBatch will now run your program.

Continue to next step.

Step 4: Examine the Output Report

[Exercise 7, Run a Batch Application]

The output report will appear in the CPro Text Viewer. It will look something like:

```

CSPRO 2.5 Text Viewer - [MyBatch.lst]
File Edit View Options Window Help
Application      C:\CSPRO Tutorial\MyBatch.bch
Type            BATCH
Input Data      C:\CSPRO Tutorial\MyData.dat

Date           May 07,2004
Start Time     12:30:23
End Time       12:30:23

CSPRO Process Summary
+-----+
|      7 Records Read ( 100% of input file)      |
|      0 Ignored (      0 unknown,      0 erased) |
|      1 Messages (      1 U,      0 W,      0 E) |
+-----+
| Level | Input Case | Bad Struct | Level Post |
+-----+-----+-----+-----+
|      1 |          2 |           0 |           2 |
+-----+-----+-----+-----+

Process Messages

*** Case [  2] has 1 messages (0 E / 0 W / 1U)
    U   -8 Too young to be married

User unnumbered messages:

   Line   Freq  Pct.  Message text
   ----   ----  ---  -
      8     1   -   Too young to be married...

CSPRO Executor Normal End
-----
For Help, press F1
Sel: (none) OVR Size: 1630byte

```

- The first several lines show file names and the date and time of the run.
- 'CSPRO Process Summary' box
 - The first line tells us that the data file had seven records.
 - The second line tells us there were no problems with the structure of the data file.
 - The third line tells us that one 'user' message was triggered by our logic. The system did no issue any warning or error messages.
 - The last line tells us that our data file has two cases in it.
- 'Process Messages'
 - This section shows messages by case by case.
 - In our example we only triggered one message, so only one case is shown.
 - 'Case [2]' shows us the case ID; in this example the second case has the error.

- 'User unnumbered messages'
 - This section shows a summary by message
 - Since we have only 'errmsg' command in our logic, there is only one line.
 - The number 8 under 'Line' tells us the line number of the errmsg command in our logic
 - The number 1 under 'Freq' tells us that this messages was only triggered once for the data file.

When you have finished examining the report, close the Text Viewer by pressing Esc or selecting **File/Exit** from the main menu.

CONGRATULATIONS! You have completed the CPro tutorial. We hope you are now ready to try creating and running your own applications. Please refer to our User's Guides for more details. You can access them from CPro simply by selecting **Help/Help Topics** from the main menu of any CPro module.

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